Rock Products

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Two New Sand and Gravel Plants in Wisconsin

Both are Equipped for Crushing, and are Constructed With Washing and Screening Apparatus

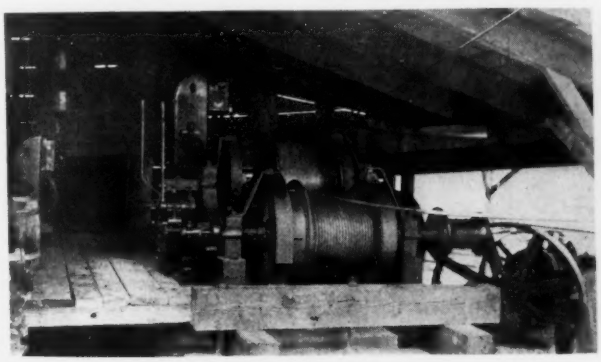
THE year 1922 saw four new sand and gravel plans get into full swing in Wisconsin, two of which are described in this issue. The Champion and Green Bay plants will be described in the April 7 issue. All four are similar in design, three of them using the dragline scraper and the fourth a cableway excavator for digging the material. Capacities of the plans run from 250 to 300 tons up to 800 or 900 tons a day. All plants are equipped for crushing and all but one are constructed with washing and screening apparatus. This fourth plant is designed to allow the addition of a screen and sand tank for washing later.

A good plant to commence with is that of the Appleton Sand and Gravel Co., at Binghamton, some six or eight miles outside of Appleton. R. F. Whale, general manager of the Waupaca Sand and Gravel Co., was general manager of this company at the time of its erection. John M. Balliet, secretary, is now in charge.

This plant has been operating since about June, 1922, with an output running from 12 to 15 cars a day of crushed, washed and screened gravel and sand.

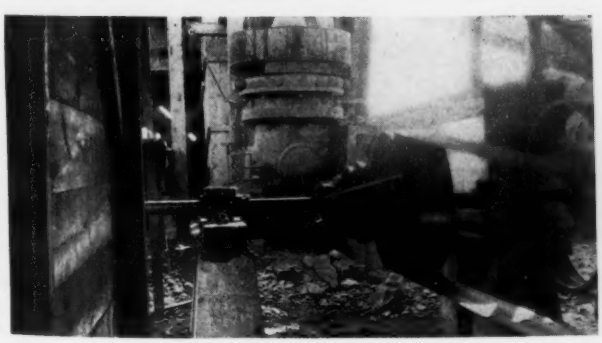
The gravel deposit is in a low hill formation of a mean depth of about 35 ft., with railroad track and plant located about 20 ft. below the top level. The material is excellent, but requires considerable washing before it is marketable.

Excavation is done with a 1-cu. yd. Sauerman LeClair bottomless power scraper



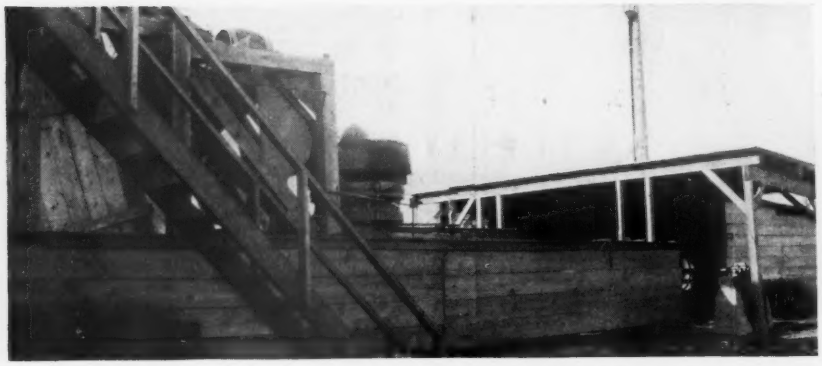
This hoist operates the drag scraper

A belt conveyor discharges to the grizzly shown



The motor drives this main countershaft, operating the entire plant except the hoist

The deposit soon after it was opened up



At the right is one main countershaft bearing. The belting is well protected. A hand wheel, just past the stairs, regulates the angle of the grizzly feeding to the crusher

The type of deadman used at Appleton

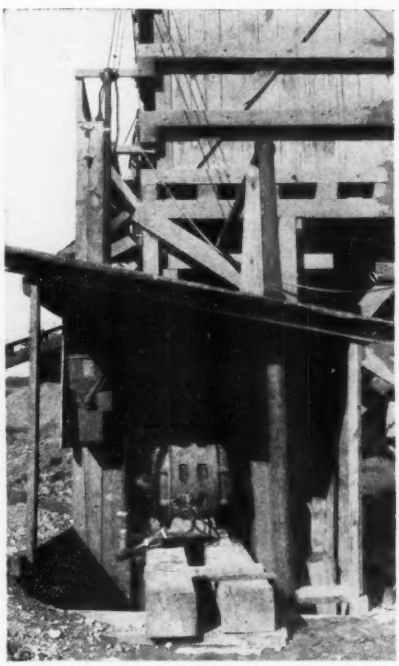
with 300-ft. span, operated with one of their special high-speed self-contained 50-hp. electric hoists.

The material is dumped automatically into a hopper and fed with a 36-in. steel apron feeder to a 24-in. by 40-ft. long Champion belt conveyor which in turn discharges to a 30-in. by 5-ft. steel bar grizzly with 2-in. spacing of bars. The fine material passing the 2-in. grizzly is collected to the elevator in a special steel chute built as part of the grizzly and the oversize stone is reduced to 2-in. with an Allis-Chalmers 4N gyratory crusher discharging the product into a separate feed chute to the elevator, located at a lower point than the feed chute from the grizzly.

The elevator is an 18-in. by 51-ft. Champion continuous bucket type, mounted on double strand of chain, with gear-driven head shaft, discharging into a 36-in. by 16-ft. Champion gear-driven revolving screen which is equipped with a wire-mesh sand jacket 48 in. in diameter by 8 ft. long.

The washing is done in that section of the revolving screen surrounded by the sand jacket, water being furnished with a 4-in. centrifugal pump from wells drilled at the plant site, and the washwater, together with the sand and dirt, are collected in a pan under the screen and discharged into a 4x18-ft. dragline sand separator. A 25-hp. motor drives the pump.

The plant as equipped will produce three grades of gravel and one grade of sand, the product being loaded into railroad cars with Ft. Wayne type pivotal gate folding bin chutes. The bin capacity is approximately 350 tons.



How the pump motor and its control box are protected

The entire equipment except the hoists is operated from a 50-hp. Westinghouse motor located at the base of the plant driving to a main countershaft.

"The only change we are planning on making in this plant this year," says J. M. Balliet, secretary and general manager of the company, "is to increase the length of our side track back of the plant to hold approximately 30 empty cars, so that in case we do not get a switch every day, we will still be able to operate.

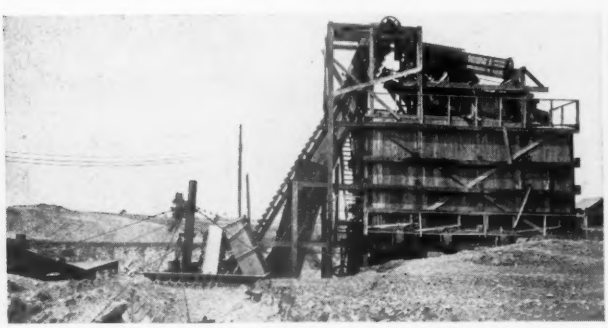
"We are also planning on a minimum production this year of 70,000 tons of material, and if the cement shortage does not become too acute, so as to bind up road projects, our production should be nearer 100,000 than 70,000 tons."

The plant was designed by the Good Roads Machinery Co., which furnished all of the equipment except the scraper and hoist, furnished by Sauerman Bros., Chicago, and the gyratory crusher furnished by Boeck-Lowe Machinery Co., Milwaukee.

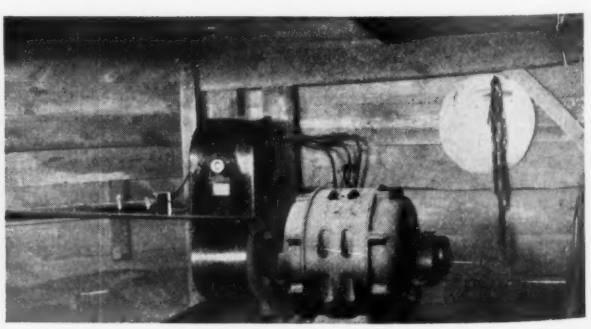
The Beechwood Plant of the Sheboygan County Highway Department

At Beechwood is a plant of the Sheboygan County Highway Department, built to furnish road material for use in the county. This plant is interesting from the side-hill location of the hopper which feeds the initial belt.

Capacity has been limited at this plant by the lack of adequate transportation facili-



In the left foreground is the grizzly, with the bottomless scraper approaching it



The "heart" of the plant. This 50-hp. motor drives all but the hoist

Just getting started, with the two crushers in place

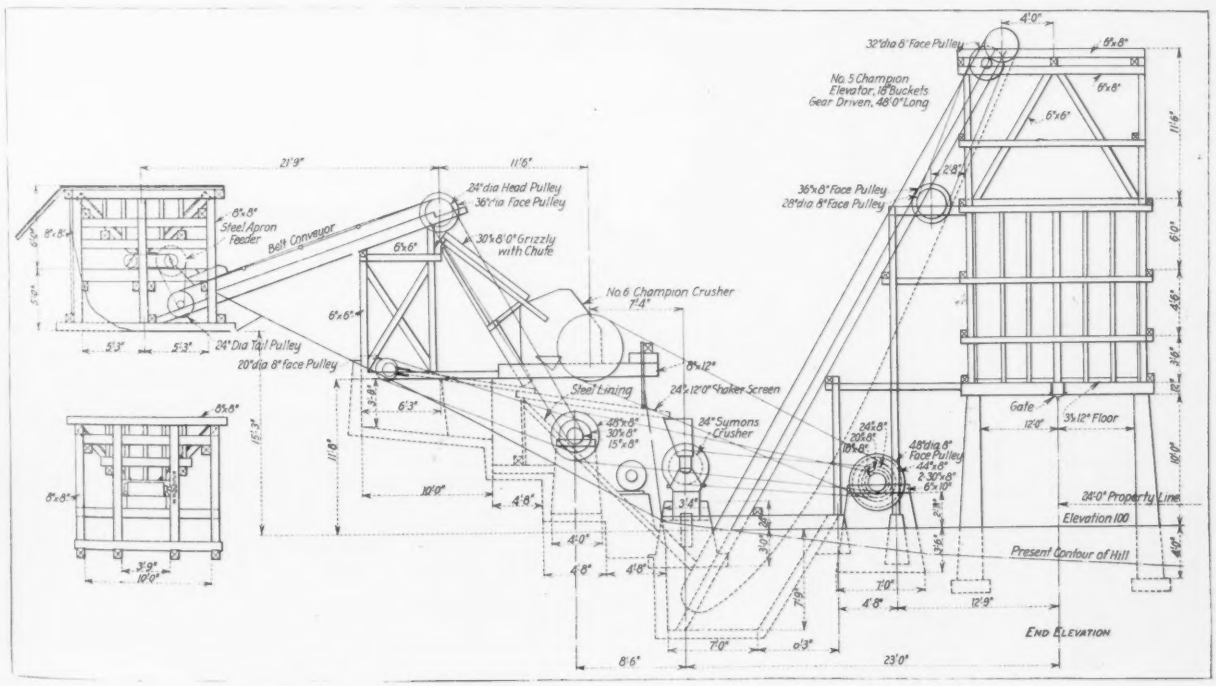
The hoist house above, with jaw crusher at left and shaking screen below

ties. During most of the season material was being hauled long distances without a sufficient number of trucks. G. W. Ubbelohde, county highway commissioner, estimates that the maximum daily output of 280 tons reached during the past season is considerably below the capacity of the plant.

The illustrations show the hill which forms the gravel deposit, with the hopper 15 to 20 ft. below the original top of the hill. The hopper might have been placed directly over the crusher, but the addition of a belt conveyor—the one installed is 20-ft. centers—makes the plant more flexible, particularly in considering future development. As a part of the deposit becomes exhausted the hopper can be moved and the belt lengthened to make the entire deposit available. A Green 1-yd. bottomless scraper bucket with double-drum two-speed electric hoist brings the material to the hopper, which is covered with a horizontal grizzly.

From the hopper a 36x38-in. apron feeder delivers the material to the 24-in. by 20-ft. concave belt conveyor leading to an inclined grizzly with bars spaced at 1½ in. This belt conveyor is controlled from the hoist house by means of a friction clutch. Oversize from this grizzly passes to a No. 6 Champion jaw crusher with jaws set at 1¾ in.

Below this crusher is a special flexible arm shaker screen 12 in. wide by 12 ft. long, with 1-in. round holes. This screen is supported from below at the feed end and suspended at the discharge end. Both the material from the jaw crusher and that which passes the special grizzly comes to this screen, the latter by means of a special chute below the grizzly. The 1-in. and under material which



End elevation of Sheboygan county's gravel screening and crushing plant

This plant is below the deposit. The hopper is half way down the hill

The belt, grizzly, jaw and disc crushers, and bucket elevator to bins

passes this screen goes direct by chute to the bucket elevator, while the oversize from this screen goes through a 24-in. Symons disc crusher set at ¾ in.

The fines from the shaking screen and from the disc crusher meet and are elevated by an 18-in. continuous bucket elevator of 48-ft. centers. This elevator discharges to the bins, but its discharge is high enough over the bins to provide for a screen and wash box in the future if needed. Bin capacity for 275 to 300 tons has been provided, and loading from the bins is accomplished by cast-iron cut-off gates. Except for the hoist, the entire plant is driven by a 75-hp. Wagner squirrel-cage motor.

This plant is planned to produce dry crushed gravel of one quality only, all 1 in. and under in size. This specification for gravel road material is quite strictly adhered to. Cost figures, including depreciation, show the average cost for 1922 to be 24.9 cents per cu. yd. The plant is so constructed that it can be quite easily dismantled and moved to another location if the supply here becomes exhausted, or if the requirement for material at this point ceases. The plant was designed by the Good Roads Machinery Co.

Moving Sand by Hydraulic Elevator

By George B. Massey
The Randolph-Perkins Co., Chicago

How 18,000 Cu. Yd. of River Sand Were Moved at Decatur, Ill., to a New Location 400 Ft. Away in a Deep Hole in the River Bed

IN HANDLING any class of material it is well worth while to make a careful study of the situation to find out the method which will give the lowest total cost—plant cost plus operating cost—for the handling of that particular yardage of material in the time available to accomplish it.

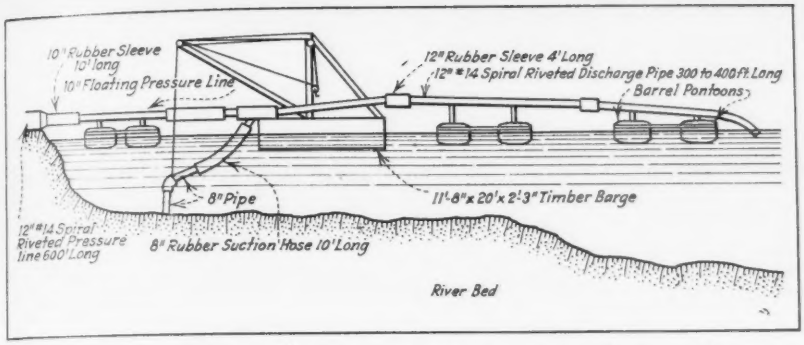
A particular job for which the writer was responsible presented the problem of moving 18,000 cu. yd. of sand in a river to a new location 400 ft. away in a deep hole in the river bed. Before deciding upon the method to be employed in moving this sand the five following methods were considered:

1. Excavating the material, loading it on a small barge, and towing the barge the required distance and dumping it.
2. Using a dragline scraper outfit for excavating and transporting to the desired location.
3. Excavating with a centrifugal dredge and pumping through a floating discharge line.
4. Excavating with a pulsometer or steam pump and boiler mounted on a barge and using a floating discharge line.
5. Excavating with a hydraulic elevator mounted on a small barge and using a floating discharge line.

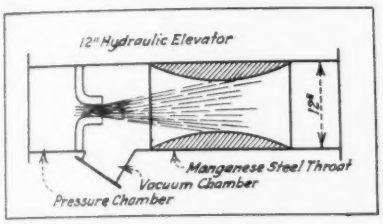
18,000 cu. yd. of sand were moved 400 ft. in this river bed at Decatur, Ill.

None of the first four possible methods was employed for various reasons. Excavating and towing would have required the building of a barge strong enough and large enough to support a dragline machine with a clamshell bucket, or a stiffleg derrick with hoisting engine and bucket. Also, it would have required barges for towing and hand labor for unloading.

The dragline scraper outfit could have been used to an advantage had it not been for the fact it was desired to pack the ex-


10" Rubber Sleeve 10' long
10" Floating Pressure Line
12" Rubber Sleeve 4' Long
12" #14 Spiral Riveted Discharge Pipe 300 to 400 ft. Long
Barrel Pontoons
8" Pipe
11'-8" x 20' x 2'-3" Timber Barge
12" #14 Spiral Riveted Pressure line 600' Long
8" Rubber Suction Hose 10' Long
River Bed

This hydraulic elevator equipment was selected from five methods as being the fastest and most economical for moving sand under water



All the wear is centered on this manganese steel-throated chamber

cavated material under the edge of a horizontal concrete apron.

Centrifugal pump equipment would have been ideal for the work, but was considered too expensive, inasmuch as it would necessitate the building of a heavy barge to accommodate the pump, engine and boiler, or a pump and oil engine (electricity was not available). Another objection to this method was the fact that the work would have been delayed while waiting for the equipment.

The pulsometer or steam pump method was not used because of the large quantity of steam required and the wear on valves and valve seats.

The hydraulic elevator method was adopted because the required amount of high-pressure water was available and because all the wear on the equipment would be centered entirely on the manganese steel throat of the elevator; a small, inexpensive barge would accommodate all necessary equipment and the pumping unit could be mounted on the shore.

One of the illustrations shows how the equipment was arranged. The elevator was placed horizontally on a small barge and the water pressure line was brought aboard on barrel pontoons. This line was fitted with 10-in. x 10-ft. rubber sleeves at both the shore and the barge ends.

The suction consisted of a 10-ft. length of 8-in. rubber hose and two lengths of 8-in. pipe. This was supported by block-and-tackle extending from a small stiffleg derrick and was raised and lowered by a hand winch.

The discharge line, varying from 350 to 400 ft., was supported by barrel pontoons, the discharge end being submerged to eliminate a static head against the elevator.

A large reciprocating pump with Corliss valve gear was used to supply the pressure water. The actual results obtained were from 50 to 60 cu. yd. of sand per hour, exclusive of the time used for changing the location. The pressure water used was 1670 g.p.m. with a pressure at the pump of 80 lb. per square inch, giving a pressure of 70 lb. at the elevator nozzle.

The elevator would begin to pick up sand at 25-lb. nozzle pressure and would work well at a 40-lb. pressure. No improvement was noticed above 70-lb. nozzle pressure.

This installation was made by the writer for the city of Decatur, Ill. The design and construction of the dam was made by Pearse, Greeley & Hansen, consulting engineers, Chicago. J. A. Holmes was the resident engineer.

A Lime Plant Chief Engineer

HARVEY S. OWEN, until recently field representative in the Central districts of the National Lime Association, with headquarters at Oshkosh, Wis., is now chief engineer of the Western Lime and Cement Co., with office at Milwaukee, Wis. This company is the principal lime producer in the Northwest, with a number of plants in various parts of Wisconsin.

Harvey S. Owen

Mr. Owen's most important immediate work will be the design and construction of a big new lime plant for the company at Green Bay, Wis. This plant will be the first high-calcium lime plant in Wisconsin, using stone from the Michigan peninsular across the lake. All limestone native to Wisconsin is of the magnesium variety.

Mr. Owen is a native of St. Louis and a graduate of Missouri University (School of Mines, at Rolla), where he specialized in mining, geology, metallurgy and chemistry. He was state chemist from 1910 to 1911. Then until 1917 he was with the St. Louis' engineering department. The Portland Cement Association acquired his services in 1917 as a promotion engineer, and he served the Lime Association in the same capacity. In 1919 he was chief engineer of the Glencoe Lime and Cement Co.

Maryland Glass Sand Co. Increases Stock to $250,000

THE Maryland Glass Sand Co., Hagerstown, Md., has increased its capital stock to $250,000 to cover the expense of extensive changes made in the company's plant at Round Top, near Hancock. An official states that no stock will be sold, as the cost of the improvements have been financed by the company. The par value of the stock is $100.

The improvements at the plant include an entire new equipment, the electrification of the plant and other changes to take care of increased business. All of this work has been done, it is stated.

Enter Building Materials; Exit Brewery

AFTER more than a year's investigation, F. L. Schott, general manager of Bartels Brewing Co., Wilkes-Barre, Pa., is founding a new industry in Wyoming valley for the manufacture of building material. The extensive plant will be located on the west side.

Mr. Schott has secured patent rights under which will be manufactured brick of a variety of designs and colors, tile for roofing, backing up and general structural purposes, blocks, cast stone, posts, light standards, etc.

A tile which will come into demand will be a specialty. The principal advantages of this tile are its adaptability to portland cement, stucco on outside wall, plastering directly on the interior walls without the need of metal or wood lath or furring. It is expected to have the plant in operation by May 1.

Underwater Storage Makes Winter Operation Possible at this Gravel Plant

The Indiana Gravel Co. of Indianapolis Uses Two Cableways, and by Operating Them in Relays Benefits by the Underwater Storage the System Affords

AFTER five years of continuous operation of a dragline cableway in its deposit the officials of the Indiana Gravel Co. found that they had excavated all salable material within reach of the cableway and that it would be necessary to change the plan of operation in order to excavate the remainder of the deposit.

How to change the plan of operation was for a while a problem. It was imperative, however, to do one of two things—either to move the screening and washing plant and cableway within range of the new deposit, or to leave the operation as it was and add to it a second cableway to excavate the material and deposit it within reach of the bucket system already in service.

After a careful study of both propositions, the latter was chosen as being the most economical as the cost of disassembling and rebuilding the plant was much in excess of the cost of an additional cableway and bucket.

Accordingly, a 70-ft. mast was erected and equipped with a Sauerman cableway and a 1-yd. gravel-type excavator. This cableway system consisted of a 1¼-in. track cable with a ⅝-in. tension cable and a ¾-in. load line. The mast was placed approximately at a right angle to the cableway which had formerly supplied the plant, and in such a position that the bucket could excavate over a 1000-ft. radius of the undisturbed deposit. Thus, the bucket picks up its load and empties it in the path of the other cableway, which in turn picks it up and conveys it to the screening plant. By handling the material in the stream much of the dirt is removed as it is emptied from the first bucket. The current at the dumping point is sufficient to carry off the foreign matter but not strong enough to affect the storage of the gravel. At this point the water is over 50 ft. in depth, thus allowing underwater storage of enough material to supply the plant for several weeks.

At the left the gravity screening plant and sand storage; at the right the masthead from which the relay bucket operates

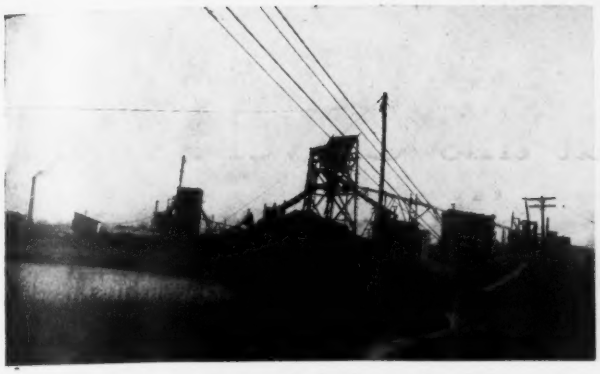
The gravity plant. The bin at the right receives the screened gravel while sand is moved through the upper flume to separate tanks

The underwater storage feature is of advantage in that there is always a supply of partially washed material on hand that is not subject to freezing. In freezing weather the material can be taken from storage, put through the plant, loaded into trucks and delivered to the job as needed.

One special feature of this excavating cableway is that it is powered by a two-speed motor hoist which permits the bucket to travel at slow speed while loading and at high speed after it is loaded and on the in-haul.

The screening plant supplied by these two cableways is of gravity design throughout. The bucket discharges into a steel-lined hopper which discharges on a 3x8-ft. section of flat woven-wire screen. Oversize material is chuted from the screen to a 9x18-in. Telsmith jaw crusher. From there it is fed to a short conveyor which discharges into the stream directly in the path of the bucket. Material that passes through the screen is chuted direct into storage bins under the screeen. Water for washing purposes is furnished by a 5-in. American pump.

The sand passing through a 3/16-in. flat



Showing the rotary plant in the background and the gravity plant and bins at the right. Note the suspended footbridge

Oversize is crushed and then returned to the stream through this chute from the elevator

screen is moved through a steel-lined flume to two storage bins of 25-yd. capacity each. Here it is separated into two grades by a section of 1x3-ft. screen with ⅛-in. perforations which is placed in the bottom of the flume directly over one of the bins. In this way the company produces two grades of sand—coarse for concrete work and fine for masonry work. This plant is electrically operated throughout and furnishes work for three men.

The rotary screening plant showing the bucket about to submerge

In addition to the gravity plant, the company operates a rotary screening plant served by a Sauerman cableway equipped with a 1½-yd. gravel-type bucket. This cableway is suspended from a 100-ft. mast at the plant and is controlled by a two-speed double-drum Thomas hoist powered by a 90-hp. motor. The bucket empties into a 20x20-ft. steel-lined hopper which discharges into a rotary scrubber and 72-in. screens of the company's own design. As there is insufficient oversize material in the deposit to justify the installation of a crushing unit, the material is returned to the pit by gravity and dumped at a point where it can be easily reclaimed. The screens are of the conical type and produce four sizes: torpedo sand, fine sand, coarse concrete gravel, and roofing gravel. Chutes extend from the side of the bins for truck and wagon loading. Water for washing is supplied through a 4-in. line by a 5-in. DeLaval suction pump direct-connected to a 25-hp. motor. This pump lifts water under a 60-ft. head at the rate of 600 g. p. m.

An overburden of 3 ft. of sandy material is stripped at this deposit by a Keystone steam shovel and is taken away by motor truck. The gravity plant has an average of 300 yd. while the rotary plant has an average of 500 yd. per day.

The gravity plant was built eight years ago and the cableway moved there from a previous location at another point on the creek. Incidentally, this was the first Sauerman cableway ever manufactured and has now had 12 years of continuous service. The rotary plant was built in 1920.

This offers an opportunity to compare the modern type of gravel plant with a plant that represents an earlier period, and it is interesting to note that the older plant is still efficient and satisfactory in its operation.

Jesse A. Shearer is the president of the Indiana Gravel Co. and Frank J. Billeter is the secretary and treasurer.

This shows the bucket dumping into the 20x20-ft. steel-lined hopper. The building at the right is the hoist house

Sales and Prices of Building Lime and Sand

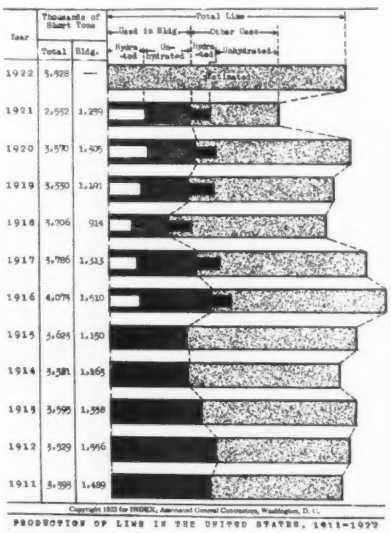
An Analysis of Construction Costs. The Cost Curve Will Continue to Move Upward in the Immediate Future

THE accompanying charts and tables are based upon the reports of the Geological Survey, according to *Index*, a statistical service for the construction industry and serving the Associated General Contractors of America.

The chart showing the "Production of Lime in the United States, 1911-22," gives graphically the relative quantity of building lime as compared with other kinds of lime sold in this country during the last 12 years. Actual production data are not available; but, as comparatively little lime is kept in stock, it is assumed that total sales are equivalent to total output. It will be noted that after the year 1916 there was a decided drop in the production of lime, but after the World War the output was increased to meet the demands of the country.

The industrial depression of 1921 left its mark on the lime industry, but, largely as a consequence of the building boom in 1922, production was again increased. Last year the total output or sales of lime amounted to 3,528,000 short tons, valued at $33,057,000, or an increase of 39 per cent above the preceding year. In 1921, 49 per cent of all the lime produced was used in construction. Exact figures for 1922 are not yet available, but most producers have reported an increased demand for building lime—in some instances, to the extent of 100 to 200 per cent.

As will appear from the chart, a considerable portion of lime sold in recent years is in hydrated form. In 1920, no less than 853,000 short tons of hydrated lime were produced in the United States, of which amount 562,000 tons were utilized for construction purposes.



PRODUCTION OF LIME IN THE UNITED STATES, 1911-1922

The table of prices of lime (delivered on the job) paid by contractors on the first of the month is based upon the reports of the Housing Division of the Bureau of Standards. It gives the prices of building lime paid each month by contractors in 20 representative cities. Considerable fluctuation is shown from month to month. At present the trend is decidedly upward.

In the table, "Prices of Sand (delivered on the job) Paid by Contractors on the First of the Month," based upon reports of the Housing Division of the Bureau of Standards, is given the prices of building sand paid by contractors in 20 representative cities on the first of each month, beginning with January, 1922, up to February, 1923. It will be noted in some cities, such as Baltimore, Buffalo, Dayton, Grand Forks and Shreveport, prices have been nearly uniform throughout the entire period. As might have been expected, the trend has been up-

PRICES OF LIME* PAID BY CONTRACTORS ON THE FIRST OF THE MONTH
(Unit = Ton)

CITIES	1922 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Aver. 1922	1923 Jan.	Feb.
Akron, Ohio	$17.00	$17.00	$17.00	$17.00	$17.00	$17.60	$15.00	$17.60	$17.60	$17.60	$18.80	$18.80	$17.33	$ 18.80	$18.80
Baltimore, Md.	15.00	15.00	--	17.20	15.50	14.00	15.00	15.00	15.00	15.00	15.00	15.00	14.97	15.00	5.00
Buffalo, N. Y.	18.00	18.00	18.00	18.00	18.00	18.00	18.00	--	16.00	16.00	--	16.00	17.40	16.00	16.00
Cleveland, Ohio	14.00	--	14.00	14.00	14.80	14.80	14.80	14.80	15.60	15.60	16.80	16.60	15.09	16.80	16.80
Columbia, S. C.	20.00	19.00	19.00	19.00	19.00	19.00	20.00	20.00	20.00	20.00	20.00	20.00	19.58	20.00	20.00
Detroit, Mich.	--	15.20	15.20	15.20	15.20	16.00	--	--	18.00	18.00	22.00	22.00	17.42	19.00	22.00
Erie, Pa.	19.00	19.00	20.00	19.00	19.00	19.00	19.00	20.00	20.00	20.00	20.00	20.00	19.50	20.00	20.00
Fairmont, W. Va.	13.12	13.19	13.19	13.10	13.10	13.00	13.00	15.00	15.00	15.00	15.00	15.00	13.89	16.00	16.00
Fitchburg, Mass.	--	18.50	--	20.00	20.00	20.00	20.00	20.00	18.00	18.00	--	20.00	19.39	24.00	24.00
Kansas City, Mo.	--	24.00	25.60	24.00	24.00	24.00	25.60	25.60	--	24.00	24.00	24.00	24.48	24.00	25.60
New Orleans, La.	16.20	13.25	14.00	14.00	--	15.55	--	--	14.00	---	--	18.00	15.26	16.00	16.00
Pittsburgh, Pa.	14.30	14.33	14.30	20.00	20.00	20.00	20.00	20.00	20.00	20.00	22.00	22.00	18.91	22.00	22.00
Pontiac, Mich.	--	13.70	13.70	13.70	13.70	13.70	13.70	15.00	15.00	15.00	16.00	16.00	14.47	16.00	16.00
Richmond, Va.	---	--	--	--	--	15.00	15.00	16.50	17.00	20.00	20.00	20.00	17.64	16.00	16.00
San Antonio, Tex.	--	22.50	22.50	22.50	22.50	16.00	22.50	22.50	19.00	20.00	22.50	27.50	21.82	27.50	27.50
San Jose, Calif.	--	28.00	--	30.00	25.00	25.00	--	25.00	--	26.00	--	25.00	26.28	20.00	--
Scranton, Pa.	--	--	--	--	20.00	14.00	14.50	20.00	20.00	--	20.00	20.00	18.36	20.00	--
Sioux Falls, S. D.	--	20.00	22.50	22.50	--	24.00	24.00	--	--	22.50	22.50	22.50	22.56	22.50	27.50
St. Louis, Mo.	--	20.00	20.00	--	--	23.20	23.20	23.20	20.00	20.00	20.00	20.00	21.07	20.00	20.00
Waterloo, Iowa.	27.60	25.60	20.00	--	20.00	20.00	20.00	25.00	25.00	25.00	25.00	--	23.32	18.00	20.00
Average	$17.62	$18.60	$17.93	$18.70	$18.42	$18.09	$18.43	$19.70	$17.95	$19.31	$19.97	$19.93	$18.76	$ 19.38	$19.96

*Delivered on the job.

PRICES OF SAND* PAID BY CONTRACTORS ON THE FIRST OF THE MONTH
(Unit = Cu. Yd.)

CITIES	1922												Aver. 1922	1923	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		Jan.	Feb.
Baltimore, Md.	$.95	$.95	$---	$1.75	$1.75	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$1.76	$2.00	$2.00
Buffalo, N. Y.	1.28	.95	1.28	1.28	1.28	1.23	1.28	.95	1.28	1.28	--	1.28	1.22	1.28	1.28
Columbia, S. C.	1.25	.95	.95	.95	.95	.95	.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Council Bluffs, Ia.	1.75	2.43	2.43	2.43	2.43	2.43	3.50	3.50	3.50	3.50	3.50	3.50	2.91	3.50	3.50
Dayton, Ohio	1.85	1.85	1.85	1.85	1.85	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.83	1.80	1.80
Erie, Pa.	2.50	2.50	2.50	2.50	2.50	2.50	2.50	--	3.00	3.00	3.00	3.00	2.68	3.00	3.00
Fairmont, W. Va.	3.45	3.50	3.40	4.39	3.25	2.40	2.40	3.75	3.75	3.75	3.15	3.15	3.36	3.50	4.80
Fitchburg, Mass.	--	1.60	--	2.00	2.00	2.00	1.80	2.00	1.80	1.80	1.80	1.60	1.84	1.80	1.80
Grand Forks, N. D.	--	--	3.15	--	3.00	3.00	2.50	3.00	3.00	3.00	3.00	3.00	2.96	3.00	3.00
Milwaukee, Wisc.	1.50	1.50	1.50	1.50	3.00	2.25	2.25	2.00	2.00	2.00	2.00	2.10	1.97	2.10	2.10
New London, Conn.	1.25	--	1.25	1.50	1.50	1.25	1.25	--	1.50	1.50	1.50	1.50	1.40	1.50	1.50
Pittsburgh, Pa.	1.15	1.55	1.95	2.50	3.37	2.50	2.50	3.10	2.50	2.50	2.50	2.50	2.39	2.50	2.50
Pontiac, Mich.	--	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Richmond, Va.	--	--	--	--	--	1.30	2.20	2.20	1.40	2.97	3.04	3.04	2.31	2.15	2.15
Sacramento, Calif.	--	--	1.25	--	3.25	2.75	1.25	1.25	1.50	1.50	1.50	1.50	1.75	1.50	1.50
San Antonio, Tex.	--	2.75	2.75	2.75	2.75	1.50	2.75	2.75	2.25	1.90	1.80	2.75	2.43	2.75	2.75
Shreveport, La.	2.00	2.25	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.50	--	2.00	1.98	2.00	2.00
St. Louis, Mo.	--	2.63	2.80	2.65	2.56	2.56	2.56	2.56	2.60	2.60	2.60	2.60	2.61	2.60	2.60
Tucson, Ariz.	1.10	1.10	--	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.14	1.15	1.15
Waterloo, Ia.	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.75	1.75	1.75	1.75	1.75	1.60	1.25	1.50
Average	$1.66	$1.84	$2.00	$2.01	$2.14	$1.93	$1.98	$2.13	$2.06	$2.10	$2.14	$2.14	$2.03	$2.09	$2.17

*Delivered on the Job.

ward, particularly during the last few months.

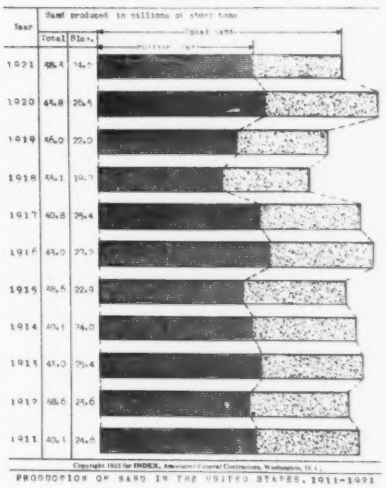
A glance at the chart, "Production of Sand in the United States, 1911-21," will show that no normal changes have taken place in the last decade with respect to the output of sand in this country. It will also be noted that the greater part of the sand produced in the United States is used for building purposes. The states of New York, Pennsylvania, Illinois, Ohio, California and New Jersey are the largest producers of building sand.

Investigation of Mineral Fillers

IN the investigation of non-metallic minerals in order to determine their use as mineral fillers, being conducted at the Southern experiment station of the Bureau of Mines, Tuscaloosa, Ala., a special study is being made of the determination of the grain size and character of grains of representative fillers produced in the district.

The investigation includes a study of the various methods of calculation of average grain size of mixed products, the development of a method of measurement of grain size applicable to fillers in which there is a great range in size, varying from diameters of 100 microns or more to 0, and the determination of average grain size of representative samples of commercial fillers including clay, barite, fuller's earth, whiting, mica, ocher, slate, silica and talc. The character and size of particle of fillers is a basic property that has an important effect on the other physical properties and characteristics and a knowledge of it is important in the application of fillers to different uses.

The effect of grain size of fillers in compounding is also being studied by the bureau. This investigation will especially be conducted along the line of determining the difference in actual use between a filler made up of mixed-sized grains as usually employed, and the same material but classified within as close limits as possible as regards variation in grain size, but having the same average diameters as the mixed product. It will also include the determination of the difference in effect between two products of the same material, but classified between different limits of grain size.



PRODUCTION OF SAND IN THE UNITED STATES, 1911-1921

The effect of heat treatment on the properties of non-metallic minerals other than clays with respect to their use as fillers is also being studied by the Bureau of Mines. This will involve a determination of the effect of heating at different temperatures on the specific gravity, loss in weight, color, grain size, oil absorption, covering power or spread and ease of grinding. Previous work on clays along the same line has shown an improvement of certain samples for filler use.

The relationship between grain size, oil absorption, and covering power of fillers and pigments is also being studied. The general direction of this relationship is known, but no exact data are available on the subject. Also for two different minerals of same size, the relationship varies and a mineralogical coefficient will be sought. In addition, the effect of products classified as to size will be studied.

Cotterill Made Counsel of the Southeastern Producers

ANNOUNCEMENT has been made by the Southeastern Aggregate Producers' Association that it has engaged the services of Charles E. Cotterill, of Atlanta, as advisory counsel. The statement says:

"Deeming it unwise to leave in the hands of any officer or group of officers, decisions affecting their competitors as well as themselves, arrangements have been made to secure the services of Charles E. Cotterill, attorney-at-law of Atlanta, Ga., as advisory counsel. Mr. Cotterill is a specialist in railroad rate matters and is totally unconnected with any individual aggregate producer. His services have been invited on the theory that his detached position will enable him to assist in the development of a rate revision that will be fair to all and comply with the law. We are also impressed with the thought that the railroads themselves will deem it helpful for us to be represented and assisted by Mr. Cotterill because they are acquainted with his technical knowledge and ability."

How the McGrath Plants Are Made Known

"IT takes sand to make money" is the slogan captioning a very illuminative four-page folder recently distributed by the McGrath Sand and Gravel Co., Lincoln, Ill. In bold type on the first page of this folder are two lines reading: "Here's how we Produce Sand and Gravel at our Five Washing and Screening Plants."

The two inside pages are illustrated below and show the view of the Pekin plant, of which, says the folder, "our four other plants at Mackinaw, Chillicothe, Forreston and Joliet are duplicates." Here, it will be observed, are given the potential daily capacities of these plants, followed by reasons why the consumer should not be indifferent about his sand and gravel when he is most careful as to the quality of cement he buys.

In the center of these two pages is a map showing the location of the plants, and the contiguous cities which the company serves. Railroad connections are always available at these plants because they are so geographically located that many open-top cars must pass daily on the return movement to the coalfields.

Thirty-six railroads make direct contract with the McGrath plants and make possible deliveries to all points that the company serves in the shortest possible time.

"We serve," says this literature, "practically all points in Illinois and many in Wisconsin, Iowa and Indiana with one or more plants."

On the fourth page is the statement that the company produces and makes immediate shipment of all grades of washed sand, block gravel, concrete mixture, road gravel, ballast, engine and motor sand and brick and plaster sand. And it concludes by the statement that "all material is prepared and graded to meet the most rigid inspection of engineers and architects."

This is truly "good medicine," and worthy of emulation by many another producer who would place his operations in black and white before the consumer that he might get in tablet form the quality and the real service which are undoubtedly given the purchaser of the McGrath products.

American Mining Congress Plans Progressing

THE plans for the National Exhibition of Mines and Mine Equipment of the American Mining Congress, to be held in Milwaukee on September 24-29, are moving forward very rapidly, states the manager, E. C. Porter.

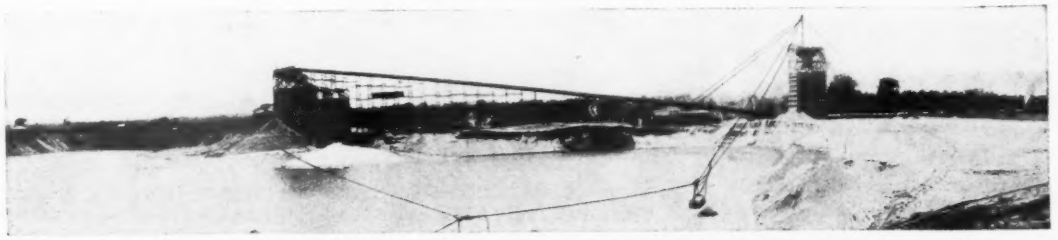
"From present indications," said he, "it seems evident that we will have in Milwaukee a much larger and more comprehensive display of mine equipment and mine machinery than in Cleveland. We have every reason to believe that the entire meeting will be more significant and larger than any which we have held previously."

N. S. Greensfelder of the Hercules Powder Co., is chairman of the board of directors of the Manufacturers' Division. This division is a permanent body of representative manufacturers of mine equipment and supplies, organized to carry on the development of these expositions in such a way as to be of the greatest benefit. The division has a direct participation in the direction and control of the policies and arrangements for these expositions.

Every mine equipment manufacturer is directly interested in the further development of these annual expositions. Ample information and instructions have been prepared for the benefit of manufacturers intending to place their products on exhibit, and floor plans and prices are available to all those interested.

As the exposition is to be held in the Milwaukee Auditorium, with its length of 220 ft. with a width of 100 ft. and a ceiling of 65 ft., it can readily be seen that this building offers an ideal exposition arena.

A VIEW OF OUR PEKIN PLANT, OF WHICH OUR FOUR OTHER PLANTS AT MACKINAW, CHILLICOTHE, FORRESTON AND JOLIET ARE DUPLICATES



THERE is never any delay in filling orders because of high waters or other flood conditions. Nor is the operation of any of our plants affected by weather. Modern equipment in the hands of experienced men assures you clean, well-graded materials, prompt deliveries and complete satisfaction.

5 Washing and Screening Plants

POTENTIAL DAILY CAPACITY.

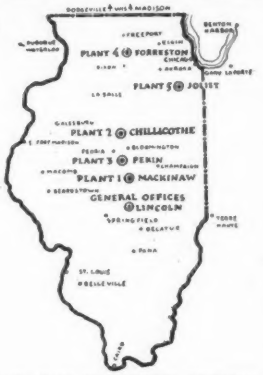
1.	Mackinaw	20 cars	1000 tons
2.	Chillicothe	33 cars	1650 tons
3.	Pekin	40 cars	2000 tons
4.	Forreston	33 cars	1650 tons
5.	Joliet	40 cars	2000 tons
	TOTAL	180 cars	8300 tons

You are careful about the quality of the cement you buy: you take no chances with that. Why be careful about the cement and indifferent about your sand and gravel?

You can drop all worry about the quality of your sand and gravel when you use our product. It is prepared with the same careful skill and the same expert knowledge as is employed in the production of any standard building material.

Our deposits of sand and gravel consist essentially of angular and sub-angular particles of sandstone—chert—granite—quartz limerock. All hard durable building materials of high cementing value.

The ability to fill orders exactly, promptly and economically is a matter of pride with our organization. Every customer, large or small, gets the same attention.



Railroad Connections

The real worth of good sand and gravel lies in the speed with which it can be put in the hands of the consumers. That's why we are serving so many users of sand and gravel within and outside the state of Illinois.

A splendid car supply is always available at our plants because they are so geographically located that many open top cars must pass them daily on the return movement to the coal fields. In addition to the advantage of procuring cars in which to load our material, every one of our five washing plants is located on railroad lines that make deliveries fast and economical. The following railroads make direct contact with McGrath plants and make possible deliveries to all points we serve in the shortest possible time.

Atchison, Topeka & Santa Fe	A. T. & S. F.	Cleveland, Cincinnati, Chicago & St. Louis	C., C., C. & St. L.
Baltimore & Ohio	B. & O.	Elgin, Joliet & Eastern	E., J. & E.
Chesapeake & Ohio	C. & O.	Erie Railroad	Erie
Chicago & Alton	C. & A.	Grand Trunk Railroad	G. T.
Chicago & Eastern Illinois	C. & E. I.	Illinois Central	I. C.
Chicago & Illinois Midland	C. & I. M.	Illinois Traction System	I. T. S.
Chicago & North Western	C. & N. W.	Lake Erie & Western	L. E. & W.
Chicago, Burlington & Quincy	C., B. & Q.	Macomb, Industry & Littleton	M., I. & L.
Chicago Great Western	C. G. W.	Michigan Central	M. C.
Chicago Heights Terminal Transfer		Minneapolis & St. Louis	M. & St. L.
Chicago, Indianapolis & Louisville	C., I. & L.	New York Central	N. Y. C.
Chicago, Milwaukee & Gary	C., M. & G.	Pennsylvania System	(Vandalia)
Chicago, Milwaukee & St. Paul	C., M. & St. P.	Pere Marquette	P. M.
Chicago, Peoria & St. Louis	C., P. & St. L.	Peoria & Pekin Union	P. & P. U.
Chicago, Rockford & Pacific	C., R. I. & P.	Peoria Railway Terminal	P. R. T.
Chicago, Terre Haute & Southeastern	C. T. H. & S. E.	Toledo, Peoria & Western	T., P. & W.
Cincinnati, Indianapolis & Western	C., I. & W.	Wabash	Wab.

WE SERVE PRACTICALLY ALL POINTS IN ILLINOIS AND MANY IN WISCONSIN, MICHIGAN, IOWA AND INDIANA WITH ONE OR MORE PLANTS

The two inside pages of a four-page folder describing the extensive operations of the McGrath Sand and Gravel Co., Lincoln, Ill.

Cement Research in Germany

Abstract of the Proceedings of Association of German Portland Cement Manufacturers

By R. W. Scherer
Western Lime and Cement Co., Milwaukee, Wis.

TO the German publication *Zement* we are indebted for a volume of the proceedings of the annual meeting of the Association of German Portland Cement Manufacturers, reports that doubtless cover the latest developments of research conducted in the interests of the cement producers. In spite of adverse conditions, scientific investigation is carried on by the association, and they seem as willing as German scientists ever were to carry on experiments for the sake of science and without expectation of immediate financial returns. Only in a few cases was it necessary to discontinue experiments and analysis on account of lack of funds. How hard conditions in the new republic are is indicated by the fact that the postcard accompanying the volume required 90 marks postage, an amount that in former years equaled $22 and which now equals in Germany one-tenth of a laborer's day's wages.

The purely scientific research into the nature of cement, the reactions both in calcining and in setting, is being prosecuted as diligently as ever. Dr. R. Nacken, Frankfurt a. M., continuing former investigations into thermo-chemical manifestations during the burning process, again determined earlier discoveries that at the stage of the formation of the clinker, when the calcium silicates and calcium aluminates are formed, the reaction produces heat; and Dr. Nacken has made an attempt to measure the calories generated by calorimetric processes. He has some expectation that thorough understanding of this process may shed some light on the process of setting.

Does Cement Crystallize?

On this much-discussed question Dr. Hans Kuhl, chief chemical engineer of the association, and in charge of the research laboratory, contributes an important paper in the proceedings. The view held in the United States is that cement when it sets, crystalizes. The Germans view the setting of cement as a colloid-chemical process. However, Dr. Kuhl finds it necessary to define the colloidal process as one in which structures may be formed that are not visible under the microscope, while he asserts that a process can only be called crystallization if well-defined crystalline structures are revealed by the microscope. He concedes that visible crystals are formed when an excess of water is present. Yet in well-prepared concrete, crystals have never been encountered or revealed by polarized light. He calls attention to the fact that crystalline precipitates are little inclined to do any cementing, while colloidal precipitates have a pronounced tendency to cement, as, witness, the precipitates of calcium oxalate and alumina. On the other hand, he has found that when thin sections of neat cement briquets are placed under the microscope in polarized light, the older pieces, though showing no crystal structures, do show a marked clarification of the field as compared with newly-cured sections.

Dr. Kuhl's work is an important contribution to the science, but the conclusion seems unavoidable that crystallization does take place even if invisible to the microscope. Furthermore, the formation of visible crystals, when an excess of water is present, and their disinclination to do any glueing or cementing in that case, seems to afford the scientific explanation of the fact that excess water in the mix is exceedingly harmful. Dr. Kuhl's new definition of colloidal processes seems a vain attempt to save the word.

On the retarding action of gypsum Dr. Kuhl has this to say, in effect: Gypsum can exert an influence in the process only by going into solution. There is a consumption of gypsum in solution because a saturated water solution of gypsum would be only 1/15 gr. per 100 grammes of cement. If such a saturated solution is used as mixing water there is no appreciable retarding action. Some cements show no retarding with 1 per cent of gypsum, but 1½ or 2 per cent produces the desired retarding of the initial set. The compound that does react with gypsum is the tri-calcum aluminate forming a double salt calcium-sulpho-aluminate. This insoluble compound is a crystalline precipitate and this crystal formation does not entail setting in the least degree. While this reaction continues there can be no concentration of tricalcium aluminate.

Potash Recovery

At the Dalen Portland Cement mill, Brevik, Norway., potash recovery is carried on by a modification of the Cotrell process, first installed by the Riverside Portland Cement Co., Riverside, Calif. To increase the quantity of this byproduct, feldspar is used instead of clay, so that the collected dust contains from 14 to 17 per cent of potash, while under ordinary conditions only from 4 to 6 per cent is obtained. H. Holter, the general manager of this mill, makes a detailed report of his efforts to increase the byproduct, and estimates his future production of potash (pure K_2O) at 1 to 1.5 kgr. per sack of cement, and in sufficiently rich mixtures to warrant shipment for fertilizing purposes.

Revision of Standards for Portland Cement in Germany

On this subject Dr. M. Gary, Berlin, contributes an exhaustive paper. The present German standards were adopted in 1909. Since then there have been many changes in manufacture and in the demands. The Association of Reinforced Concrete Workers has demanded a revision of the standards, and it is deemed advisable that the manufacturers anticipate the association's wishes.

It appears that the present demand in compressive strength in 1:3 mortar mixtures after 28 days is 140 kgr. per sq. c. m. In a cement-testing and research laboratory maintained by the German Association of Portland Cement Manufacturers, samples of cement from 82 different sources were tested, many of these repeatedly at stated intervals. Not one tested below 250 kgr. per sq. c. m. after 28 days' storage. Most of them range between 300 to 450 and three attain strengths of over 550 kgr. How this compares with our American standards and actual results attained in compressive strength, we have not the means to determine, as we don't know the size of the cross-section of the briquets used under the metric system. The average of the German tests, 400 kgm. per square centimeter, would mean more than 800 lb. for less than ¼ sq. in.

Compressive strength, the test on which in Germany the highest value has always been laid, increased rapidly above the last standard adopted until the dearth of suitable materials was brought about by the war and post-war conditions. At the present time the quality of the product as revealed by this test is again improving, though a great number of inferior substitutes are flooding the market. Concrete workers are demanding a standard of 350 kgr. after 28 days. Besides this, they are insistently demanding

cement with a high initial strength—super-cements as their manufacturers would like to have them termed. They are, however, only cements with high initial tensile strength and their superiority in the long run still requires demonstration; after 30 to 40 days the ordinary portland cement gains on the other in strength. It is thought not impossible that portland cement could be modified to atttain high initial strength and that new standards to be adopted could prescribe a high value at two days or seven days.

There is also a disposition to supersede the compressive test by a "smashing" test, a measure of the ability of the concrete to resist blows, similar to the test for toughness now used in this country on stone, and a combination of transverse pressure and a measured blow are even proposed, mostly in the interest of concrete ship and barge building.

Investigation of Concrete and Reinforced Concrete

A subject of vital importance to building industries—that of the effect of marsh water on concrete—has been very carefully investigated. At first small test pieces of various mixtures were subjected to the action of marsh water for several years. As larger masses of concrete would not be similarly affected, these were also tested and immersed in marshes for 10 years, large tile, footing and columns, and the following conclusions have been reached:

The quality of the mixing water is immaterial, no detrimental effects could be noted when marsh water was used in the mixing. Thin-webbed structures like tile when made in the ordinary way cannot resist the action of marsh water for any length of time. Care in the selection of aggregates is essential; siliceous stone and sand showed the best results. Such integral waterproofing compounds as were tested proved even harmful. Protective paints can also be dispensed with.

The large castings were apparently little affected. It is to be regretted that no actual tests could be undertaken on account of the lack of funds or rather because of the rapid demonitizing of the funds set aside. But it was evident that the mass concrete would be good for many years. On the other hand, the complete failure of the tile has led to further investigations on the subject. Parafine and asphaltic tar coatings will be tried.

It is a fact that where there are free sulphides or sulphates in the water, iron as well as cement with its calcium must disintegrate. It is noteworthy that in all discussions of the German association on this and kindred subjects portland cement, slag cement and iron portland cement are carefully distinguished. In fact, each of the three types has its own association. In this investigation is was found that iron portland proved greatly inferior in marsh water.

Competition of Super-Cements

The super-cements now being marketed in competition with standard portland cement were discussed. Evidently some of these are obtained by extraordinarily fine grinding of the standard product. The latter is now ground to a fineness so that none of it is retained on a 900-mesh screen, and only from 3 to 24 per cent on a 4900-mesh screen, corresponding approximately to the 200-mesh (per lineal inch) in use in this country.

Cement is on the market which at seven days attains nearly its maximum strength and that strength is greater than is reached by standard cement in 28 days. The advantage to the building trades in permitting the early removal of centering is apparent and justifies the higher price which must be obtained for the product. But it remains a question, to investigate which further provision has been made by the associations, whether the resulting concrete is not brittle and more apt to crack and rust the reinforcing steel, and whether the greater ultimate strength of standard cement is not more desirable than the quick-working qualities of the more expensive product.

Failure of Concrete in Bridge Investigated

The failure of two concrete piers in a bridge at Magdeburg was investigated and reported by Dr. Framm. Two large piers had to be entirely replaced. The cause was found to be a considerable underground current of water containing 1700 mgr. of sulphates per liter—a saturated solution of gypsum. A laboratory was erected at the site supplied with flowing water from the underground current and various experiments with protective coating, various kinds of cement and mixtures are being conducted from which some definite results may be expected. While this danger was guarded against in replacing the two piers, the incident emphasizes the necessity for painstaking investigation before building rather than determining the cause of failure later.

What Does a Cement Plant Cost?

IN considering Senator Calvert's bill for a state-owned cement plant, one is forced to wonder how the senator arrived at his conclusion that $500,000 is a sum sufficiently large to be of any real service in the prosecution of any such project says the *Daily Oklahoman*, Oklahoma City. For even a casual investigation of the subject will show that from four to six times this amount will be needed if the state is to build a plant large enough to be of real service.

It is said by those in a position to know that close to a million barrels of cement are used on public works in Oklahoma yearly. If, therefore, the state goes into the business, a plant capable of producing 600,000 bbl. of cement yearly is as small as should be considered it would seem. And to build, equip and supply such a plant—to put it in shape to begin business and to supply it with materials for three months' operation—will cost between $2,500,000 and $3,000,000.

Public Roads, issued by the federal government has printed figures showing the results of exhaustive study of this matter of cement plants by experts. These figures are based on the cost of a plant with an annual capacity of 600,000 bbl. It shows that in 1920 such a plant equipped with makeshift buildings would have cost $2,090,000; while with permanent buildings the cost would have been $2,921,000. In addition, it is shown that $219,250 would be required for supplies with which to begin the actual manufacture of cement. (The article in *Public Roads* was reprinted practically in full in ROCK PRODUCTS of March 26, 1921, p. 54.) These supplies would last approximately three months.

Since 1920 the cost of building and equipping such a plant has fallen between 10 and 15 per cent, it is stated. This shows that a 600,000-bbl. plant would cost today $2,826,325, if equipped with permanent buildings, and $2,078,325 if temporary buildings were erected.

Is it altogether certain therefore that a state-owned plant, with the lax management that always accompanies public work, could be made to pay even if it sold cement at the present price.

Marquette Cement Co. to Sell "By the Sack"

CEMENT has for many years been shipped in sacks and used accordingly, but as a matter of custom it was at first shipped in barrels and quotations and purchases made on a barrel basis, announces the Marquette Cement Mfg. Co., Chicago.

But, says the announcement, "On and after March 19 this company's cement will be quoted, sold and invoiced by the sack instead of by the barrel. Cement is shipped in sacks. Concrete and mortar are proportioned and estimated on the basis of a sack of cement. For these reasons and for the greater convenience of those who handle and use our product this change is being made. We are blazing another trail for those who handle and use our product."

National Agstone Association Decides on Big Program

At the Columbus and Harrisburg Meetings It Planned to Found Another Five-Year University Fellowship, Establish a Research and Review Service, and Finance an Advertising Program

BROAD, constructive activities were decided upon by the National Agstone Association at its two recent meetings at Columbus and Harrisburg. Every evidence of co-operation and good-will was shown by the members attending and they were behind every movement to further the interests of their industry.

At the outset of the Columbus meeting, on March 5, President Lamkin stated that three objects were the purpose of the meeting—founding and financing an agstone fellowship at the Ohio State University; establishing a research and review service; financing an advertising program.

Founding of University Agstone Fellowship

Prof. Firman E. Bear, chief of the soils department at Ohio State University, presented in detail the work the Ohio College had done, is doing, and expects to do in teaching the need of agstone on Ohio farms. He called attention to an editorial in the *Breeders Gazette* of March 1, and a story in the *Country Gentleman* of March 3, in which doubt is expressed as to whether the soil needs limestone to encourage the growth of certain plants. "These articles are not in harmony with the teachings of soil experts. They are disputed by experience and experiment." Prof. Bear made an earnest appeal for an agstone fellowship at Ohio State University. Discussions and questions followed his address.

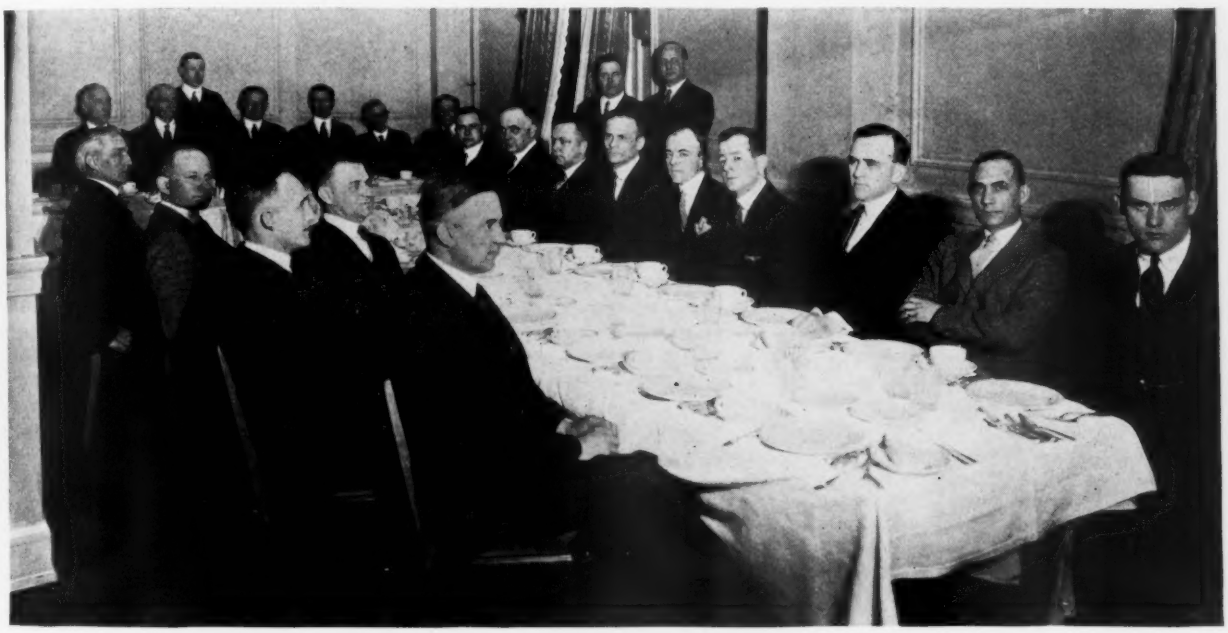
April 1 was deemed an opportune time to start the fellowship work, if a suitable man could be found satisfactory to Prof. Bear, the Agricultural College, the Board of Trustees of the university, and the National Agstone Association. The young man accepting this fellowship is to devote his entire time to this work with a month's vacation each year.

Prof. Bear further advised the donors of this fellowship not to expect immediate results, as this fellowship would be to establish basic facts on which the State University could base the compilation of future bulletins and its program of teaching the needs and the results of using limestone, and thereby assist the agstone industry in promoting the sale and use of agstone in the best way to do the most good for the farm.

A New Chapter in Agstone

It was voted that the association finance an agstone fellowship at Ohio State University for a period of five years at $2000 per year. This sum is to be paid in quarterly installments by the following Ohio agstone producers: The Ohio Marble Co., Piqua; Carbon Limestone Co., Youngstown; Bessemer Limestone Co., Youngstown; Kelley Island Lime and Transport Co., Cleveland; France Stone Co., Toledo; Colgan Limestone Products Co., Columbus; Marble Cliff Quarries Co., Columbus.

The producers agree to accept this obligation for themselves and their firms, separate and apart from their regular membership dues in the National Agstone Association. These fellowship dues are to be paid to the secretary of the National Agstone Association and he to keep this account separate from the regular association records. This fund in turn is to be paid by the treasurer of the national association upon approval



Luncheon at the Harrisburg meeting of the National Agstone Association on March 6

and order of executive board to the university.

An agreement was reached that the results of this fellowship in the university, at a total cost of $10,000, subscribed by Ohio agstone producers, should be used to benefit and promote the interest of all members of the association.

Research and Review Service

In the matter of a research and review service, agreed to at the Chicago meeting on January 18, Mr. Hall moved and Mr. King supported a motion that Secretary Sandles and Harry H. Brandon proceed to arrange with Prof. Bear of Ohio State University to secure the services of some person to assemble bulletins, reports, literature and data published or issued by agricultural colleges, experiment stations, soils departments, farm papers, trade journals, etc., having a bearing upon the agstone industry. That such person shall review all such literature and reports and assemble them in the form of a slipping service and reasearch comments and furnish them to all members of the association to assist them in promoting the use and sale of agstone, and not more than $1000 per year be spent in research and review service. The motion was agreed to.

Association Advertising

As to general association advertising, President Lamkin, as chairman of the advertising committee, reported that he had interviewed several advertising agencies and that, with one exception, these agencies had asked for a large retainer fee to give the campaign consideration or prepare a prospectus. Mr. Lamkin stated that the John S. King Advertising Agency had volunteered to prepare an outline which if not accepted would cost the association nothing.

Mr. King presented his program, art work, designs, etc., and stated that the cost of this ad program in the *Ohio Farmer* of Cleveland, and the *National Stockman and Farmer* of Pittsburgh, for 4 half pages and 20 quarter pages, would cost $4400.

It was agreed that the King advertising agency be authorized to prepare copy, approved by the national association, and place advertising in the *Ohio Farmer* and in the *National Stockman and Farmer* as heretofore outlined by Mr. King, at a cost to the national association of $4400, including art work, commissions and all other charges.

It was also agreed that the association accept the back cover page of *Macadam Service* for advertising space at $60 per issue and that the secretary prepare copy and have it printed in colors.

An appropriation of $5000 for a general advertising campaign in Ohio, to be paid by Ohio agstone producers on the basis of their 1922 tonnage output was made, to be collected from the following Ohio firms: Carbon Limestone Co., Youngstown; Kelley Island Lime and Transport Co., Cleveland; Ohio Marble Co., Piqua; Colgan Limestone Products Co., Columbus; Marble Cliff Quarries Co., Columbus; France Stone Co., Toledo.

The following were present:

E. M. Lamkin, Kelley Island Lime and Transport Co., Cleveland; J. C. King, Carbon Limestone Co., Youngstown; Clyde Calvin, Bessemer Limestone and Cement Co., Youngstown; W. H. Margraf, Marble Cliff Quarries Co., Columbus; Harry H. Brandon, A. Acton Hall, Ohio Marble Co., Piqua; Frank Colgan, Colgan Limestone Products Co., Columbus; H. E. Bair, France Stone Co., Toledo; George D. Williams, American Farmers Supply Co., Cleveland; M. L. De Venne, C. W. Fuller, Columbia Products Co., Cleveland; Prof. Firman E. Bear, Prof. Robert M. Salter, Ohio State University, Columbus; P. G. Clemons, the Jaite Co., Jaite; N. E. Shaw, E. B. Stapleford, National Stockman & Farmer, Columbus; R. S. Newman, Ohio Farmer, Cleveland; John S. King, John S. King Advertising Agency, Cleveland; E. G. K. Meister, Cement, Mill and Quarry, Cleveland; A. P. Sandles, secretary, Claude L. Clark, assistant secretary, National Agstone Association.

The Harrisburg Meeting

J. C. King, chairman of the board of directors, presided at the Harrisburg meeting, held at the Penn-Harris hotel on March 6. He stated that, at the suggestion of the Pennsylvania agstone producers, this meeting was being held to discuss a general advertising campaign in Pennsylvania and also to discuss a $100,000 memorial building at Pennsylvania State College in memory of the late Dr. Freer.

Chairman King introduced Prof. J. W. White, who made an appeal for funds for this building. He said that the first use of agricultural lime of record was in Lancaster county, Pennsylvania, and his state had nearly one-fourth of all the limestone in the United States.

Chairman King stated that he was in thorough sympathy with Prof. White's splendid address and that agstone producers would personally contribute, but being a national association, with members in many states, he doubted the wisdom of the association voting funds at this time for this project.

Pennsylvania Group Advertising

President Lamkin, reporting for the advertising committee, stated that he had discussed this matter with the John S. King Advertising Agency at Cleveland and outlined a publicity campaign to cost $3000 for advertising in the *National Stockman and Farmer* and the *Pennsylvania Farmer*. He also presented a diagram of art work to decorate advertising space in these papers.

Chairman King told what the Ohio group had done in the way of establishing a research service bureau, an agstone fellowship for five years, and an advertising campaign at a total cost of $16,000.

In the general discussion by producers from Pennsylvania and New Jersey, Mr. Bixler of New Jersey said his company would support this general advertising campaign, but that it was so thoroughly sold on advertising that it would advertise in 75 papers.

"The Hour of Feed"

In characteristic fashion, Secretary Sandles stated in the association bulletin that "Agstone producers broke bread with distinguished citizens of the Keystone state. Governor Pinchot is one of the foremost Americans in the public eye today. Dr. Thomas, as president of the Pennsylvania State College, is a noted educator. His chief soil expert, Prof. J. W. White, is known throughout the country. The secretary of agriculture, Mr. Willits, is a dirt farmer and the champion mushroom grower of the nation, his annual production being 50 tons, which he markets at $500 to $600 a ton. Director Byers of the State Chamber of Commerce, has had experience as agricultural agent of the New York Central Lines, and is now boosting agricultural limestone and lime. These men were our guests. Lieutenant-Governor David A. Davis came to the hotel and expressed regret that pressing official duties would prevent his presence."

At the afternoon session it was decided to advertise, the following firms expressing their willingness to subscribe $1700: Carbon Limestone Co., Ohio, $500; Limestone Products Corp. of America, New Jersey, $250; Michigan Limestone and Chemical Co., New York, $500; York Valley Lime and Stone Co., Pennsylvania, $100; New Castle Lime and Stone Co., Pennsylvania, $100; Grove City Limestone Co., Pennsylvania, $100; Limestone Products Co., Pennsylvania, $50.

The Pennsylvania producers agreed to hold another meeting on April 3 at Harrisburg to further discuss this advertising campaign. Each producer present agreed to urge all Pennsylvania producers to attend and secure the additional $1300 to pay for the $3000 advertising campaign.

A telegram from Otho M. Graves of General Crushed Stone Co., Easton, Pa., was read, in which Mr. Graves, as chairman of the membership committee of National Crushed Stone Association, offered the services of that association to assist the Agstone Association in any way possible. A. Acton Hall of the Ohio Marble Co., Piqua, Ohio, a director in the National Crushed Stone Association, outlined its objects and urged the quarrymen to join.

President Thomas and Prof. White extended invitations to the association to hold a meeting at Pennsylvania State College. Chairman King assured these gentlemen that their invitation would be accepted.

The attendance was as follows:

Governor Gifford Pinchot; President Thomas of State College; W. C. Byers, agricultural bureau director of Pennsylvania State Chamber of Commerce; Mr. Willits, Pennsylvania State Secretary of Agriculture; Prof. Hitshman, Prof. J. W. White, State College, Pa.; E. B. Reinhold, Reinhold-Owens Co., Pittsburgh; K. C. Styers, Grove City Limestone Co., Grove City, Pa.; R. W. Stone, assistant state geologist, Pennsylvania Geological Survey; S. S. Scholl, E. I. Du Pont de Nemours & Co., Pittsburgh; William D. Kochersperger, Limestone Products Co., Mifflinsburg, Pa.; A. Acton Hall, H. H. Brandon, Ohio Marble Co., Piqua, Ohio; W. S. Rupp, Baugh & Sons Co., Baltimore; Ellwood Gilbert, New Castle Lime & Stone Co., New Castle, Pa.; Glenn H. Campbell, National Stockman & Farmer, Pittsburgh; E. R. Walker, Pennsylvania Farmer, Philadelphia; Fred J. Streeter, Michigan Limestone and Chemical Co., Buffalo, N. Y.; Edgar M. Lamkin, Kelley Island Lime and Transport Co., Cleveland; Edward S. Bixler, Limestone Products Corp. of America, Newton, N. J.; R. S. Newman, Ohio Farmer, Cleveland; J. C. King, Carbon Limestone Co., Youngstown, Ohio; F. W. Cramer, York Valley Lime and Stone Co., York, Pa.; John B. Fox, West Branch Lime Co., Williamsport, Pa.; A. P. Sandles, secretary, National Agstone Association, Columbus.

What Car Service Division Is Doing

IN his address before the Car Service Division of the American Railway Association, at the dinner of the Springfield Traffic Club on March 8, Donald D. Conn, manager of the Public Relations Section, had this to say as to the work of the association's Car Service Division:

With specific reference to the Car Service Division I want you to know something further about its organization, its power and what it is doing. Reporting to the chairman of that division are four managers of departments or sections. One manager deals with railroad relations; another gives his entire time to the movement and relocation of open-top cars; closed cars come under the supervision of a third manager, and the relation between the division and the public is handled by the fourth manager. Each maintains his particular department with its various ramifications, yet one is inter-related with the other so that a homogenous machine is constantly watching the car requirement of shippers, territories and the different railroads. This division has all the power necessary to relocate cars between railroads or between territories of the country. All railroads have subscribed to carry out the orders issued by the division and, furthermore, orders when issued for relocation of cars have been, and are now, being carried out by the individual railroads.

Yet the power of the Car Service Division goes even beyond the right of relocation, because it may designate the movement of empty equipment to certain lines or territories, and via certain lines.

Expansion of Car Service Division

To effect a closer and local relationship with the railroad officers and shippers, to provide a neutral point of contact with shippers and their associations for the purpose of maintaining a common ground of understanding of your transportation problems, and the methods by which we meet them, to localize the supervision of our car service endeavors—to the end that car distribution may meet most effectually the demands of commerce, the car system organization is in the process of expansion. As you know, the Car Service Division has maintained for several years an office in Chicago, and this extension of their work has proven so satisfactory that district managers have either or are to be placed at Minneapolis, St. Louis, Dallas, Birmingham, Cincinnati and Toledo. The decentralized supervision thus obtained will permit of the closest observation of the needs of shippers and individual railroads.

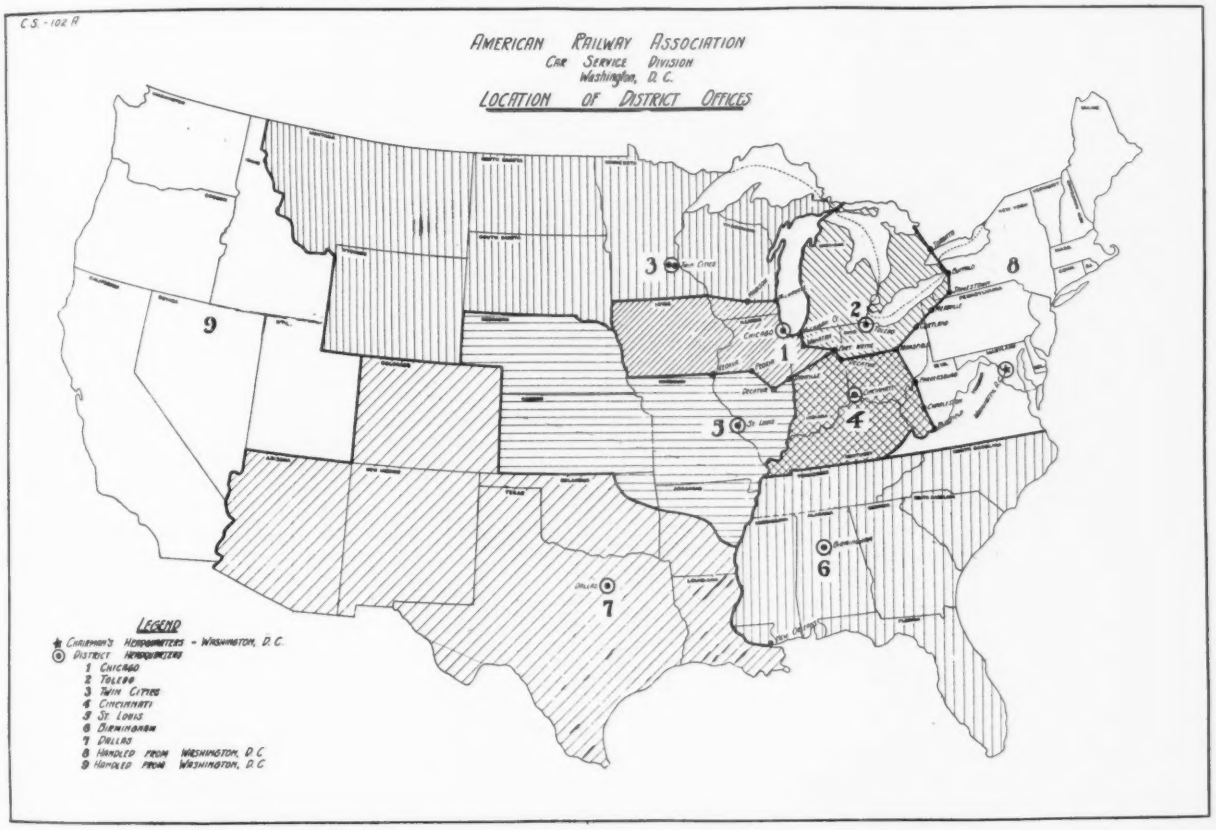
A competent corps of car service agents is allocated to each district manager for service in his particular territory of jurisdiction. These agents will check the observation of car service rules by close contact with the operating conditions in each territory to insure that regulations are practically applied as conditions and circumstances governing the carrier's or shipper's situation shall demand.

Co-operation with Shippers

Predicated upon the sound premise that both the carriers and the shippers can and should meet upon a common plane of understanding in mutually working out their transportation requirements, and to more accurately portray the demands and responsibilities of the railroads in the different territories of the country, the Car Service Division has inaugurated a program whereby each district manager will surround himself with an advisory board of shippers—representatives of the production and manufactures in each territory. This plan has been put in force in the Northwest at Minneapolis and will be extended as rapidly as possible to the other district officers.

What Constitutes a "Transportation Shortage"

When we speak of "car shortage" we really mean a shortage of transportation to meet the full requirements of the public.



A corps of car service agents is allocated to each of the district offices shown here

This involves the adquacy of not only cars, but also tracks, locomotives and movement. It involves industrial as well as transportation facilities. It is dependent also upon the use made of equipment by shippers.

You, of course, appreciate how the movement of cars last fall was measured by the disarrangements of transportation and industry, due to the coal miners' strike and shop strike. It was not possible to quickly recover from either, and this would have been equally true no matter what agency was charged with the responsibility of car handling. No one can sit in Washington and issue an order that will create locomotives or build more tracks over night.

Here we must not overlook the fact that car surplus existed during every month of 1921 and for each of the first eight months of 1922. Surplus cars ran up to 495,000 monthly and reported shortages to 166,000 during the peak month of last fall. Surely attention must be directed to ways and means of perfecting a more even distribution and marketing of seasonal shipments thus leveling out these peaks and valleys of volume and price trends.

Periods of car surplus represent periods of idle capital, and when you consider that since 1912 we have had 87 months of transportation surplus and 45 months of transportation shortage, you can readily appreciate that "cars" alone represent the one factor in the creation of a transportation shortage or surplus.

Conditions in the South

By George M. Earnshaw
Associate Editor, ROCK PRODUCTS

Labor Supply Is Excellent and Great Progress Is Being Made in all Rock Products Industries. Biggest Need Is a Remedy of the Car Shortage and the Stabilizing of Freight Rates

THE SCARCITY of rock products operation in the South has caused me to get over the ground much faster than I had anticipated and now I find myself in Ocala, Fla., after spending the past two weeks between here and Chattanooga, coming by way of Atlanta, Savannah and Jacksonville.

Labor Conditions Excellent

Everywhere in the states I have passed through labor seems to be plentiful and consequently cheap. Whether it is a stone, cement, sand and gravel, lime or phosphate operation, all use negro labor, both skilled and unskilled, at a cost approximately one-half that paid by producers in the Northern states.

At first thought, one would be of the impression that this condition is not unusual; that it is natural for the South to be free of worries from this source, but only during the past two years has the South been immune from labor shortage. During the World War and the two years following, Southern producers experienced more trouble in keeping an adequate labor supply than any other section of the country, due to the recruiting of negroes by agents of Northern industries who invaded the South and offered higher wages. But the situation is normal once more and the operators are appreciative of the labor supply.

Scarcity of Cars

That the railroads cannot supply the demand for cars is especially apparent in Georgia. Sand producers over the entire state have given up all hopes of getting open-top cars. The saying that "Necessity is the mother of invention" has certainly been put to good use here, for had the producers in Georgia not devised a method for loading box cars, every one of them would have been obliged to shut down. But even devising a means for loading box cars has not completely relieved this group of producers, for they now find that in addition to their inability to furnish them with even enough cars of *this* class, the railroads do not have adequate motive power to move those cars that *are* loaded. It was surprising for me to learn while visiting a 15-car-per-day sand operation in southern Georgia that the 53 box cars which I counted on the side tracks had been loaded several days and that they would not be moved until such time as the railroad could spare a special "double-header" to move them to their destination.

Need of Co-operation

The conditions existing at that plant are representative of many sections of the South, and it is because of such conditions that the organizers of the Southeastern Aggregate Producers' Association realized that it was imperative for all of the producers of the Southeastern states, irrespective of what aggregate or stone product they produced, to get together and put over a united drive for better car service and a revision and stabilization of rates.

That the operators of this entire section realized such an organization is necessary was evidenced on February 19 at Atlanta, when 215 of them answered in person to the appeal of three of the most progressive men in the rock products industries of the South—A. P. Burke, H. B. Springer and A. S. Waterman. Only one letter telling the purpose of the proposed association was necessary to bring these men together to form an organization for the general betterment of railroad conditions of all the rock products industries of the Southeast.

South Is Rapidly Progressing

At practically all of the operations I have visited thus far, it is not uncommon to find the plants in the course of reconstruction and to note that the original paint is still visible on occasional pieces of modern equipment. This movement is especially apparent at the lime operations in Florida. One company in particular has been making an extensive study of oil for fuel in shaft kilns, experimenting with different types of burners and fuel oil, until now they have determined that lime can be produced approximately 50 per cent cheaper with oil than with wood for fuel. However, this fact applies only to this company's locality, due to the rapid approach of depletion of the wood supply and consequent high prices.

Another company in the Ocala district has installed a rotary kiln and is experimenting with the oil-burning process. It has met with excellent results. In addition to rotary kilns and oil-burning equipment, these companies have also recently installed modern hydrating equipment as well as other machinery for manufacturing lime in a quantity and at a cost unheard of with the old-fashioned methods.

The South is gradually coming into its own and will soon be able to progress with the same strides as many of its neighboring producers.

LIME ASSOCIATION CONVENTION

THE fifth annual convention of the National Lime Association will be held at the Hotel Commodore, New York City, on June 13, 14, and 15.

The work of the convention will be devoted in a large measure to reports from the technical men of the research organization, and from the field engineers of the association.

Hydraulic Power vs. Compressed Air as Applied to Rock Drills

A ROTARY hydraulic rock drill has been invented and tested with success at various state quarries in North Wales, which, it is said, will eventually replace the present compressed-air percussive drills, which are a source of danger to the health of operators because of the dust given off by the discharge of exhaust air from the machines, writes B. V. Stuart Davies in *Engineering and Mining Journal-Press*. It will be argued that sprays and other devices may be adopted, while a drill is in use, which will eliminate the cause of "miner's pthisis," but in practice, even when these spraying appliances are in use, it is invariably found that minute articles of dust are present in the atmosphere.

It will be stated in favor of compressed air that the use of this force assists or augments ventilation in mines, but if figures are carefully studied it will be seen that the amound of free air given off is negligible, while the horsepower expended to provide the free air would ventilate the entire mine if applied to a fan.

In coal mines the application of water, as a power, will prevent the accumulation of coal dust in and around that area most susceptible to the presence of coal gas (firedamp). Thus another source of danger is removed besides providing the necessary fire-fighting appliances, from the mains carrying power to drills, all the way from the shaft to the working face.

A type of rotary hydraulic rock drill has been in continual use for over three years and is still in excellent condition due to the fact of its being designed to reduce friction to an absolute minimum, both theoretically and practically. There is no intermittent percussive action, and therefore no replacements of damaged parts have been necessary, although working under a pressure of 400 lb. per square inch. The turbine in this new drill is so arranged that the whole pressure is extracted before the fluid is discharged at the exhaust. Professor Louis has stated that on the Rand it has been found that, taking the average of a large number of plants, it was necessary to apply 28 hp. to the compressor in order to obtain 5 hp. at the drill, and that out of the 5 hp. delivered at the drill only 1.7 hp. ever reached the face of the rock.

When drilling is in progress further losses are involved, which are caused by fragments of stone, already chipped off, remaining at the base of the drill hole. These prevent the succeeding blow delivering its full force upon the rock, by forming a cushion, thereby expending the energy in converting fragments already removed into a fine powder. This energy again reduces the effective work in drilling with compressed air to about 3 hp., which means 99 per cent of wasted energy from compressor to face of bore hole.

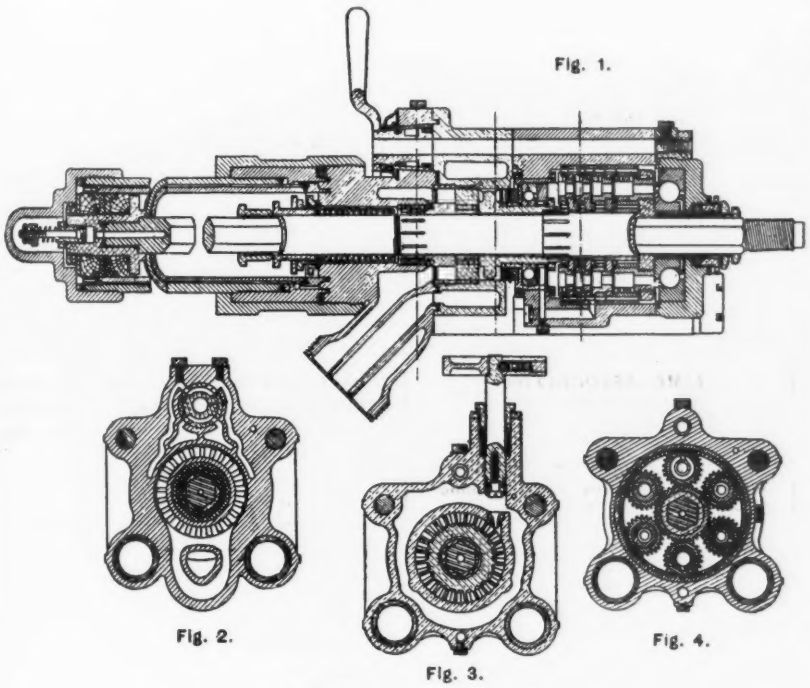
In the case of a hydraulic pump and rotary hydraulic drill, assuming the same input of 28 hp. be applied to the pump, about 23.8 hp. would be delivered to the drills and about 14 hp. would represent effective work in rock drilling. This equals 50 per cent of power supplied to the face, as against 1 per cent of compressed-air power.

The rotary hydraulic rock drill is the invention of Moses Kellow, Park and Goesor Quarries, Penrhyndeudraeth, North Wales, and is manufactured under license by Holman Bros., Ltd., Camborne, Cornwall, England, and is known as the "K" type Kellow rock drill. Other advantages claimed over compressed-air percussive drills are that the Kellow drill bores the entire length of the hole with stoppage to change drills, and that it bores a hole of uniform diameter and perfectly round.

Whether the fluid for operating the drill be air or water, it is necessary that this fluid should be under pressure. In the case of air this is produced by an air compressor, and in the case of water by a pump (except when sufficient natural head is available). The stroke of an air compressor consists of two parts, viz., that which brings the air up to working pressure required by the drills and that which delivers the compressed air into the main.

If it were possible to work under ideal conditions—that is, compression without increase of temperature and assuming a working pressure of 80 lb. per square inch—about 15 per cent only would represent the latter part of the stroke during which air is being used by the compressor, and this part alone is made use of in the drills, as it is neither usual nor is it advantageous, that they should use air expansively. When water is substituted for air, the necessity for devoting 85 per cent or even a part of the stroke to bring it up to working pressure is obviated, and the volume delivered into the main is the full 100 per cent (minus any small slip past valves or connections, which is common to both air compressor and pump). With the use of compressed air this becomes less efficient, as high pressures are used.

An air compressor of given capacity, and delivering air to the drills at 50 lb. pressure per square inch, would supply nearly the same total available energy to the drills as



Keltow hydraulic rock drill

Fig. 1, longitudinal section. Figs. 2, 3, and 4, transverse sections

another of similar capacity delivering air at 100 lb. pressure, the reason for this being that the volume would be less at the higher pressure.

The power required to produce air at 100 lb. pressure per square inch would be considerably more than that required at 50 lb. pressure, so that this in itself precludes the use of air for transmission of power other than at comparatively low pressures. With water, 700 lb. up to several tons per square inch can be adopted without involving the objections which are present in the alternative system.

To illustrate the effect of the character of the fluid upon the machines producing the pressure, it may be stated that a displacement capacity about 60 times as great is required for air at 80 lb. per square inch pressure as for water of 700 lb. pressure, based upon equal delivery of energy at the drills.

The variations in pressure during the stroke of an air compressor necessitate the use of a complicated type of machine with moving crossheads, connecting rods, cranks, shafts, and heavy flywheels, besides elaborate methods of dissipating heat due to compression and in the case of a two-stage compressor a duplication of the entire plant, with the addition of intercoolers.

Taking the alternative of a simple pump, driven by the commonest source of power —i.e., steam—direct coupling of steam and water cylinders is the mode adopted, and none of the complications of the alternative compressed-air system is involved. By the adoption of a duplex type of pump fitted with a regulating valve, the speed of the pump is automatically varied from a maximum to zero, altering the delivery according to the requirements of the drills and taking power only in proportion to the work done.

A pump may be driven from any source of power other than steam, and in the case of deep mines existing, pumping plants may be utilized by the addition of a regulating valve and coupling to the rising main.

In the case of the discharge, this is negligible; the water used may be collected in a sump to be used again, with little or no loss. Therefore, in case of only a small feed of water, hydraulic drills can be employed and existing pumping arrangements are not interfered with in any way.

The weight of the drill at present in use is 50 lb., inclusive of the steel; however, this can be reduced to 39 lb. without lowering the factor of safety, which is extremely high for experimental purposes. Holes may be bored from 1¾ up to 4 in. or even with higher diameters without interfering with the mechanism or the speed of the drill. By reason of simple gearing speed may be reduced from the maximum to conform to the nature of the rock encountered.

The full pressure, adopted to drive the rotary hydraulic drill, is utilized to force the bit into the bore hole, or, rather, against the face of the rock.

Thus if 700 lb. per square inch is used to rotate the bit, the pressure against the rock face is 700 lb. per square inch, and uneven and jerky, with the consequent danger of bending or breaking.

As spare parts of the Kellow drill are standard, there is no difficulty of obtaining any part from the manufacturers, and skilled labor is not required to change any part of the simple mechanism.

There is a difficulty to be overcome, and that is the outlay. Not for pumps and main, which are obtainable at less cost than compressors, receivers, or other apparatus, but for the drill itself. The present price is high, owing to the fact of a small demand, as the drill has just been placed on the market. However, with mass production the cost will then compare favorably with other rock-drilling machines on the market.

The difficulty of obtaining a suitable joint for water mains at high pressures has been effectively overcome, and when the new hydraulic rotary drill has been adopted universally it is believed the costs of driving, sinking and stopping will permit the opening up of new fields at present out of the reach of even large syndicates.

February Cement Output

PRODUCTION of portland cement in February was greater than in January, notwithstanding the fact that there were three less working days. The total output for the month was approximaely 7,971,000 bbl., an increase of 86 per cent over February, 1922. Mills operated at approximately 72 per cent of capacity.

The unusually heavy winter movement of cement, which was noted in January, was continued throughout February, 6,022,000 bbl. were shipped from the mills during the month, or 83 per cent more than a year ago. The best previous February was in 1920 when 3,987,000 bbl. were shipped.

Both production and shipments for the first two months of this year were greatly in excess of any similar period in previous years.

Stocks of finished cement at the mills were approximately 13,343,000 bbl., which is about 10 per cent above the average for the past five years.

Unusual activity in dwelling construction this winter partially accounts for the heavy demand at this time. Also the unprecedented volume of building permits issued and concrete pavement yardage awarded thus far this year has stimulated dealers and users to store cement in advance of the advent of milder weather. During the past three years, 1920-1922, approximately 68 per cent of the cement consumed was moved during the six months' period, May to October. Co-incident with this movement is the heavy transportation demands of many other industries, which develops many difficulties for the cement manufacturer, including the distribution of the product and securing fuel supplies.

PRODUCTION, SHIPMENTS AND STOCKS OF PORTLAND CEMENT, FEBRUARY, 1923, AS PUBLISHED BY PORTLAND CEMENT ASSOCIATION

Producing Districts, as shown in Statistical Reports of United States Geological Survey	Number of Mills*	PRODUCTION FEBRUARY 1923	1922	1921	SHIPMENTS FEBRUARY 1923	1922	1921	STOCKS AT END OF FEBRUARY 1923	1922	1921
1 Eastern Pennsylvania . New Jersey and Maryland	R 21 E 1 N	2,048	1,455	949	1,203	830	728	4,115	3,969	2,633
2 New York	R 8 E N	345	229	148	153	93	139	890	1,054	771
3 Ohio, Western Pennsylvania and West Virgina	R 9 E 1 N	708	215	441	568	247	267	1,141	1,182	1,135
4 Michigan	R 12 E N	325	119	63	267	129	128	690	818	555
5 Illinois, Indiana and Kentucky	R 8 E 2 N	1,518	641	948	1,114	402	531	2,166	2,551	2,361
6 Virginia, Tennessee, Alabama and Georgia	R 7 E N	456	359	320	414	303	262	260	448	314
7 Eastern Missouri, Iowa and Minnesota	R 9 E N	879	313	522	836	225	341	2,019	1,965	1,628
8 Western Missouri, Nebraska, Kansas and Oklahoma	R 10 E 1 N 2	526	268	347	411	300	282	963	971	741
9 Texas	R 4 E 1 N	307	204	178	252	202	147	265	331	220
10 Colorado and Utah	R 5 E N	81	12	43	89	39	63	164	142	169
11 California	R 7 E 2 N 1	587	421	428	624	428	424	146	427	491
12 Oregon, Washington and Montana	R 8 E N	191	40	34	91	70	68	524	273	294
TOTAL	R108 E 8 N 3	7,971	4,276	4,421	6,022	3,268	3,380	13,343	14,131	11,312

S-17

Figures represent barrels, 000 omitted. One barrel equals four sacks.

*R—Mills reporting.
E—Mills estimated.
N—Mills not operating.

Total Production
1922—113,870,000 bbl.
1921— 98,293,000 bbl.

Total Shipments
1922—116,563,000 bbl.
1921— 95,051,000 bbl.

These reports embrace actual figures or estimates for all Portland Cement Mills in the United States

Book Review

The Engineering of Excavation. By George B. Massey, member Am. Soc. C. E., Am. Soc. M. E., etc.; 376 pp., 6x9, 196 figures and three folding plates showing details of hydraulic and dipper dredges. Cloth; $6, postpaid. John Wiley & Sons, New York.

Reviewed by Edmund Shaw

THIS is a book that ought to be owned by everyone who is interested in excavation on anything larger than a pick-and-shovel scale. It is thoroughly practical, for Mr. Massey has made it from his field notes taken in many countries, including such faraway ones as Russia and Siam, as well as in the principal European countries and most parts of the United States. And he has been at the work since 1899.

But while the book is practical enough, it is not without its faults. There is too much space given to dredging for a book that is supposed to cover the whole field. The author's point of view is rather that of the big contractor than of the operator of a sand pit or quarry. Such an important excavating machine as the cableway dragline is given only a paragraph in the chapter on tower excavators, and in discussing hydraulicking there is no mention of the work in the Florida phosphate fields, where hydraulicking has been studied and brought to the highest efficiency.

But one can pardon the author for these omissions when he reads the book and finds in it so many things that he wanted to know. Mr. Massey says that he wrote it to give the sort of information that he was continually seeking while he was "out on the job," and the book does contain a lot of information that is wanting in those faithful friends, the pocketbooks and the manufacturers' catalogs.

In discussing steam shovels, the author is positive in his preference for the large revolving type over the standard form, and says that it should always be given first consideration. There are some 30 excellent pages on this machine, the most important of which describe methods of laying out the work so as to determine the dumping radius and clear lift required, and hence the size of shovel that should be employed.

Examples are given as how to plan the box cut and to find the curve of the bank, this being an interesting application of graphic methods. Under Machine Details, there are tables of the principal parts, with the weights and dimensions, for the best known makes. This greater part of the data is drawn from stripping practice in the Kansas coal fields, but of course the principles find application in any sort of digging.

In writing on the standard steam shovel, the author has perhaps given too much space to details of construction, but the shovel operator will be interested in knowing the "why" of these familiar things. In discussing outputs of shovels, it is explained that outputs based on experience in digging the Panama Canal and like big jobs cannot be duplicated under operating conditions, and reasonable outputs for different sizes of shovels handling various materials are given. Especial mention is made of the steam shovel in sand and gravel work, and there are diagrams showing the standard layout and method of starting a cut. The small steam shovel, for digging cellars and like work, is briefly described.

The chapter on dragline excavators is full of meat. There is an excellent description of the mechanical operation of the machine, and, what is of more importance, there are diagrams and tables to aid in laying out the work and calculating the necessary size of cut. This part of the book is taken from practice in stripping phosphate rock in the Florida fields, where the dragline is much employed even by those companies which do the actual mining by hydraulic methods.

There are short chapters on the dry land dredges and trench machines, and a good chapter on the various buckets that are used in excavating with dragline and locomotive cranes. What is said about transportation of the excavated material and drilling and blasting is good, but there might well be more of it than the 30 pages that are devoted to these important subjects.

Almost half of the book (181 pages) is devoted to dredging. This is disproportionate, but the reviewer hesitates to find fault with the book on this account, because he has found in those pages so many things that he wished to know. The practical man who has been puzzled by the "characteristic curves" which the manufacturer sends out with every pump, will find a clear explanation of how to read them, and he will also find how to use the formulas for determining the friction head and the diameter, or peripheral speed, or runner necessary for different heads. There are good tables showing the cubic yards per hour of dredge pumps, with different velocities and percentages of solids, but, unfortunately, they begin with the 12-in. pump. The 10-in. and even the 8-in. and 6-in. pumps might have been included for the benefit of the sand dredger.

The 8-in. pump is included in the tables for friction heads for different pipe-line velocities, but this table begins with a velocity of 10 ft. per second, although lower velocities are very often employed, and one manufacturer at least has recommended 7 ft. per second as a good, practical speed for his pump in pumping sand.

There is a good discussion of the difference in friction head in pumping clear water and in pumping water and solids. Some allowance ought to be made in the method of calculation shown for the fact that the percentage of solids increases with the length of the pipeline, due to the fact that the water flows faster than the solids, which the author calls attention to in another paragraph. His figure of 50 per cent efficiency for a dredge pump sems rather high, especially if any allowance is to be made for normal wear. The reviewer knows that one very good engineer, who specializes in dredge pumps, uses 43 per cent in all his calculations.

There are excellent plates and descriptions of large hydraulic and dipper dredges, but these will have only an academic interest for the rock products man. The dipper dredge gets a lot of space, while the ladder (bucket line) dredge is rather scantily treated, the description being confined to differences in European and American practice and the big California placer dredges. The increased use of this type of dredge in sand and gravel work on the Potomac, Delaware, and other rivers should have been mentioned.

One is especially glad to find in this book clear and simple explanations for the design of dredge hulls and for making the necessary calculations. This humble branch of naval architecture has received too scant attention in the books, and the man who wants to know the primary facts of hull design is apt to get lost in the maze of calculations for center of buoyancy and the metacenter. But in this book they are explained in such a way that anyone can understand and use them. These few pages will be worth many times the cost of the book to anyone who has to do with the design and operation of dredges.

The style in which the book is written is that of the best modern technical books, a series of short paragraphs made up of short and direct sentences, that can be easily read and retained in the mind. The book is well illustrated; if anything, there are more photographs than are needed to "sell" the text to the reader. Cost figures are entirely omitted and, while cost figures are always very interesting, the decision to omit them was probably dictated by experience.

Quarry Engineering

Time to Practice More Engineering in Quarry Operation

By R. N. Van Winkle

Secretary and Treasurer, Iowa Stone Products Association, Cedar Rapids, Iowa

THE quoting under the heading "Quarry Operators and Engineering" in your February 24 issue, of Oliver Bowles, mineral technologist of the U. S. Bureau of Mines, should bring to the attention of every quarry operator and owner a phase of quarrying which has already been too generally neglected, and that is the utter disregard for technical brains and engineering advice in that industry.

It is a comparatively recent thing that a few of the bigger and more progressive companies have found that it pays to have a technical engineer in the organization, and in most instances he is now a part of the operating and advisory staff. In days gone by the engineer's duties were too often ended with the designing and building of the crushing plant and from that day forth he was generally as welcome around the average quarry as a revenue agent at a bootleggers' picnic. His services were a necessary evil in designing and building the plant, but as for his knowing anything about the crushing and producing of stone, "lord forbid." It took brawn and strong backs, not "book learnin'" for this. So it's just this attitude and misguided judgment on the part of the majority of quarrymen that has prompted Oliver Bowles to say regarding the 600 stone quarries he has visited in recent years that, "Many of these quarries are highly efficient operations, but, on the other hand, I find some processes in use that are as crude as those employed in Egypt when the pyramids were built."

The engineer is the pioneer of civilization, efficiency and system, and the quarryman who believes, or the big business man in any line who thinks, that he can advance and prosper while disregarding engineering principles and technically-trained brains, will ultimately fail in his purpose and desires.

It's being modest when I say that 75 per cent of the quarries in this country today are sadly in need of seasoned technical engineering brains and advice. By this is not meant the brains of so-called sales engineers, but brains of unbiased engineers who have not only the technical training, but the actual experience in quarry operation and management. Operating engineers we might term them; the sort of men who by experience and training can come into your quarry and tell you why you are not getting the tonnage; why you're not getting results in shooting. He's the man who can pick up the loose ends and stop up the leaks in your own operations.

Lack of attention and forethought to field operations—that is to say, operations outside of the mill or crushing plant—have brought more real grief to the average quarryman than any other one thing. Haphazard stripping methods, poor drilling, wasted dynamite, and inadequate trackage in the quarry are some of the costly field operations. To successfully operate a quarry a man must have vision, imagination, and constructive talent and should plan a year, or maybe two years ahead, as hand-to-mouth methods in quarry operations cannot long survive.

Quarrymen as a whole are very ready to consult with electrical or mechanical engineers regarding mechanical and electrical trouble, but they are quite opposed to solicit advice or criticism from anyone in reference to actual field operations, as this seems a sacred subject to him.

Every quarry operator and owner at some time or another has had field operating problems that were worthy of the best advice that trained technical brains could give. It will pay the average quarryman handsomely if he will occasionally seek the advice of a technically-trained, unbiased, experienced engineer. It is about time if the quarry industry is going to survive and prosper, that the "rule-of-thumb, strong-back and weak-mind" methods be eliminated.

Quarrying Stone by Mining Methods

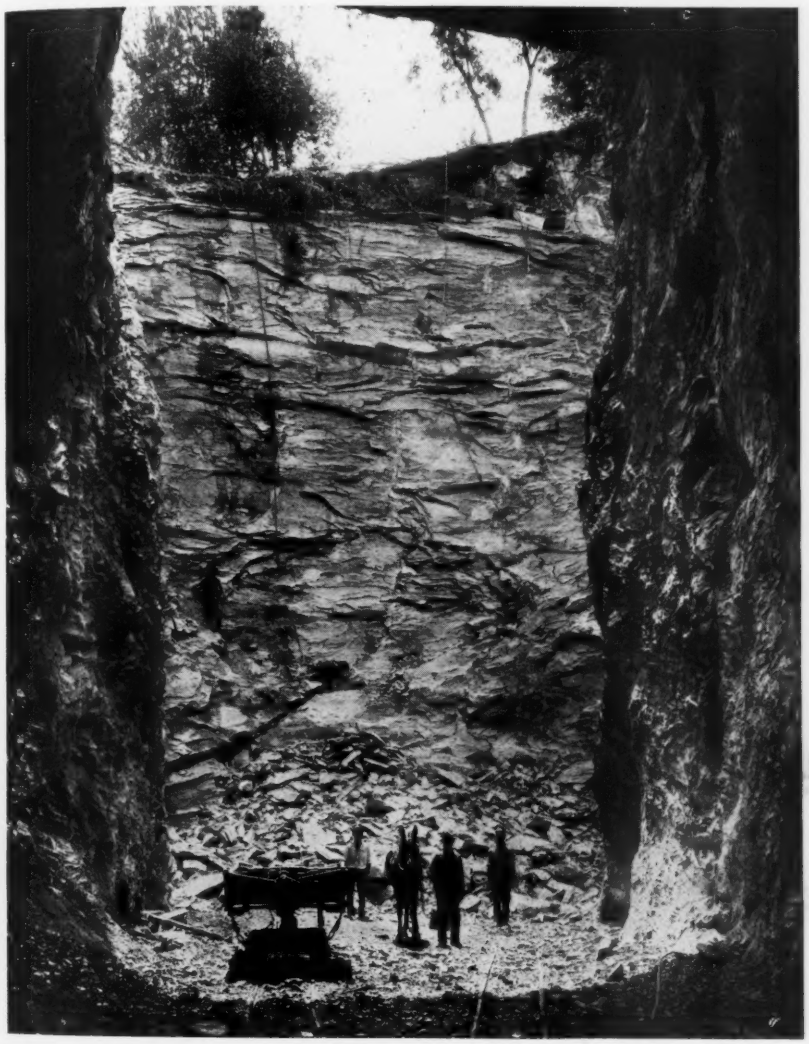
THERE is possibly nowhere a more interesting rock-quarrying operation than that of the Princess Iron Corp. at Craigsville, Va., writes R. M. Valz, a representative of the Du Pont Co., in the *Du Pont Magazine* for February.

Tunnel mouths in the face of the quarry. Note that the quarry floor is being taken up

This quarry was secured by the corporation in 1915 for the purpose of supplying its Glen Wilton blast furnaces with high-grade calcite flux. For several years it was operated as an open-pit quarry, but in 1919, when the face became worked up to a height at which the overburden of earth and seam of shaley limestone would

have required very extensive stripping, the management decided to mine the stone underground by means of a series of tunnels driven in the face of the quarry, thereby escaping the expense of heavy stripping.

The quarry face at this time had reached the height of 90 ft. and was still getting higher.



This tunnel, driven through the overburden, is now an open-pit quarry

Tunnels were driven at distances of from 75 to 100 ft. apart in the face of the quarry, which forms a crescent about 600 ft. around. These tunnels or underground quarries were driven by keeping headings shot forward at the top and working down in benches. The tunnels are from 30 to 50 ft. high, and from 20 to 36 ft. wide at the entrance, gradually widening out and becoming higher inside. Some of them now extend a distance of 300 ft., and several are 80 ft. high and 100 or more feet wide.

As work progresses some of these tunnels will be merged, thereby making a large underground quarry. Pillars are left standing at certain distances to support the overburden, a practice similar to that followed in coal mining. Thus, underground amid surrounding not unlike those found in many mines of the anthracite region, the quarrymen-miners and their helpers are every day drilling, blasting, loading and hauling calcite out of the tunnel openings instead of coal.

Quarrying or mining stone in this way would seem to be an expensive operation as compared with open-pit quarrying, but it has not proved so with the Princess Iron Corp. As the need here is for a high-grade limestone flux, free from dirt, this method of quarrying assures an absolutely clean product without the necessity of washing or picking. Stripping is entirely eliminated. Bad weather has no effect on the workers underground.

This quarry has a daily capacity ot 500 tons of furnace flux stone and 250 tons of crushed commercial stone.

Recent I. C. C. Decisions

Crushed Limestone Rates.—Examiner Charles R. Seal has advised the dismissal of No. 13319, Sunderland Brothers Co. vs. Director-General, Chicago, Burlington & Quincy et al. on a finding that rates on crushed limestone, from Whitestone, Ga., to Lincoln, Neb., in April, 1919, and June, 1920, were not unreasonable or otherwise unlawful.

The Commission found not justified a rate of $1.76 per ton from quarries at Martinsburg, West Virginia, on the Baltimore & Ohio Railroad to Youngstown, Ohio, alone, and ordered the cancellation of the schedule carrying this proposed rate without prejudice to its publication provided the Baltimore & Ohio also establishes a rate of $1.51 to Beaver Valley points in Pennsylvania. This is the new rate of the Western Maryland. The Baltimore & Ohio did not propose reductions to the latter points, but did propose a cut to Youngstown on the ground of competition by ex-lake limestone. Commissioner Meyer, who prepared the decision, said that the commission was not convinced that ex-lake competition was such a controlling factor as to warrant a reduction in the Youngstown rate because of dissimilarity of conditions without a similar reduction by the Baltimore & Ohio to Beaver Valley points.

Cement Increase Forbidden.—In a report on I. and S. No. 1618, cement from Ohio and Mississippi river crossings and Richard City, Tenn., to stations in Tennessee, the Commission has found the proposed increase in rates on cement, from the river crossings and points taking the same rates, to Nashville and Clarksville, Tenn., and from Richard City, Tenn., to Nashville, via interstate air route, had not been justified. The evidence dealt largely with increases proposed from Jeffersonville and New Albany, Ind., Louisville, Kosmosdale, Ky., and Richard City.

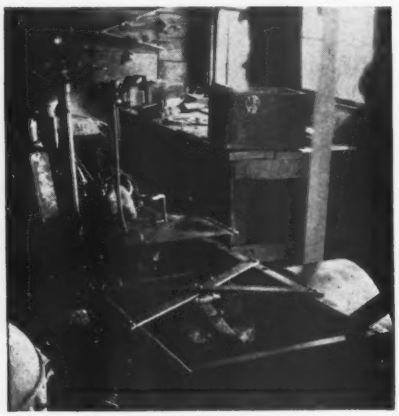
The rates proposed from Richard City were put forward, it was said, to correct a relationship between that point and Leeds. The Commission said that, while an increase from Richard City to maintain a proper relationship with the rate from Leeds, the record afforded no basis for determining the proper relationship between the rates from the two points.

The rates under suspension constituted part of the adjustments the carriers sought to make, following the Commission's decisions in Memphis, Southwestern and other cases. They were proposed as a substitute for the cement rates brought forward in the efforts of the carriers to adjust the rates to, from and between points south of the Ohio river, dealt with in 64 I. C. C. 306. The ones put forward in that case were withdrawn with a view to having the carriers and shippers agree outside the hearing.

Hints and Helps for Superintendents

Cheap Power for a Machine Shop

THE proud boast of the Raleigh Granite Co., Greystone, N. C., is that they run a heavily equipped machine shop, having two lathes, a planer, three drill-presses, one drill sharpener, a circular saw and six emery



This old tractor was put to service as a power unit for an entire macihne shop

wheels, ranging in size from 8 to 18 in., at a total cost of $1.40 per day.

One interesting feature is that this inexpensive method of operating was discovered by accident. At the time the shop was set up, the company installed a large gasoline engine to drive the machines. This engine consumed several dollars worth of gasoline per day in addition to several quarts of oil. It was necessary one day to borrow the engine to run a more important unit in the plant proper, due to another machine breaking down. This, of course, left the machine shop without motive power.

Then the present power system was installed. An old tractor was salvaged which for many years had been in the junk pile, and after considerable repairing had been done it was set up in the shop with the rear wheels jacked up and connected by belt to the main line shaft. It was found that this form of power was even more satisfactory than the former unit, as it was of more simple construction and was less complicated.

Although installed to serve only until the other engine could be returned, their old tractor is still in use after several months of service.

In a 10-hr. day, it only consumes six gal. of gasoline and one quart of oil—a total cost of $1.40.

Peep Hole in Bucket

ACCORDING to one of the steam shovel operators employed at the quarry of the Pembroke Limestone Works, Pembroke, Va., he has for many years been running his shovel "in the dark," inasmuch as he claims that when operating a shovel, it is impossible for a runner to know whether he has a bucketful when operating in stone. This is because he cannot actually see just how full the bucket is from his position at the levers.

This seems strange, but when given proper consideration, it is obvious that it is true. The chances are that nine out of ten dips made by the average operator are full loaded, but it is only because the operator could *feel* it and not because he knew it.

In order to increase the quarry efficiency, the company decided that one way would be to use a bucket that would permit the runner to see inside. Since it was necessary at that time to have a new bucket, the company specified when ordering that a space 4 in. wide be cut between the hinges at the top of the door. The illustration shows the bucket after it had been cut. In using this bucket, the operator not only *feels* a loaded bucket but he *knows* when it is loaded. This bucket is in service on a 60-ton railway type machine.

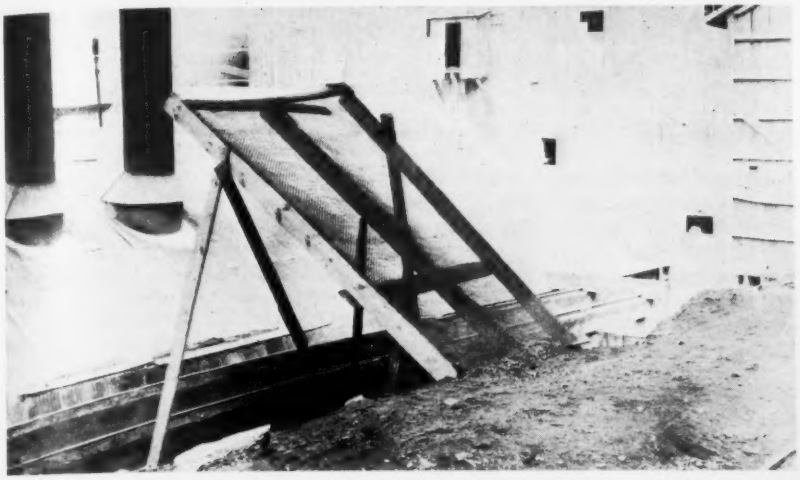
With the space cut out of the bucket door the operator knows rather than guesses when the bucket is full

This machine shop, driven by an old tractor, is powered at a cost of $1.40 per day

Saves by Screening Coal

AT plants located several miles from a town or city and having their own community, it is necessary for the company to furnish its employes with fuel in addition to owning a commissary for supplying them with other commodities. In such cases, it is to a company's advantage to be able to supply its employes with these essentials at the lowest cost possible.

The Pembroke Limestone Works, near Pembroke, Va., has its own settlement and maintains a commissary as well as supplying the households with coal. With the present high prices of coal, it would be practically impossible for the average lab-



By screening run-of-mine coal the company can furnish its employes with an excellent grade at a minimum cost, using the finer grade to power its plant

orer to buy screened coal, which is the necessary grade for heating stoves. With this in mind, Superintendent A. W. Lumsden devised a method whereby the company can furnish the employes with screened coal at approximately one-third the price charged by the mines.

This is made possible by the company buying run-of-mine coal and unloading it into the bunkers through a 1-in. screen, shown in the illustration. The coal under 1 in. is suitable for the boilers and that which is retained by the screen is loaded into trucks or wagons and delivered to the employes' bins at a cost slightly in excess of the price paid by the company.

Handy Derrick

THE accompanying view of a Missouri river sand operation shows a method of handling material that has not been developed to its full possibilities—namely the use of a long-boom revolving derrick. This particular installation was designed to unload barges by means of a clamshell bucket, and to thus feed the hoppers of the two elevators to the screening plant. The same rig, of course, could be used to load cars direct, and if properly placed could be used to put screened material in storage, and take it out again, on the other side of the plant. Such a derrick requires but one man to operate, and by careful planning the hoist could be so placed as to serve as a car puller and do other necessary work about the plant, such as handling screen plates and other machinery parts.

Old Belts for "Safety First"

HEREWITH is illustrated how an old piece of conveyor belt can be used to protect the workmen in a crushing plant.

The drive pulley in the illustration is belt-connected to a gyratory crusher and the belt passes under the overhead structure containing conveyors, screens, and chutes. It had been noticed several times that stones dropping occasionally from either the conveyors, screens or chutes would fall on this drive belt; they would be thrown off at the end with terrific force, thus endangering the safety of anyone passing by. This ingenious method was devised accordingly, merely consisting of a piece of belt suspended by wires

Since its installation no accidents or near-accidents have happened. Many equally simple schemes will add truth to "safety first" campaigns.

This old belt, suspended by wires, eliminates all chances of anyone being struck with a stone from the fast-traveling drive belt

Derrick as a "Handy Andy" at a sand plant

Slate Granite Patent Valid

THE United States Circuit Court of Appeals has held the Schroder patent No. 1,007,146 invalid because anticipated. The decision was made in a suit brought by the Staso Laminated Slate Co., owner of the patent, against the Stowell Mfg. Co.—280 Fed. 107.

The patent is for a prepared roofing, which consists of a body portion having a coating of adhesive waterproofing material, such as asphalt and an outer protective coating of crushed slate. The alleged novelty in this patent is twofold: Material and method of application of crushed slate, applied by rolling in contact with an adhesive coating of asphalt. Ground slate had been used in the John's patent of 1872, No. 125,574. It was claimed that crushed slate is superior to other kinds of slate material, because slate laminates when crushed and the laminæ when rolled and pressed together match and overlap one another, so as completely to cover the asphalt coating and give a smooth surface and uniform color which cannot be obtained with a gravel, sand or other crystalline covering. This result cannot be secured, so it was claimed, by the use of ground or powdered slate, because it has no laminæ to match and overlap one another.

The defendant contended that the patent was invalid because Edward J. Schroder was not the original and first inventor, claiming that A. C. Hall was the inventor of substantially the construction described and claimed in the patent which had been in public use or on sale in the United States more than two years before the application for the Schroder patent.

Similar Product Marketed in 1906

Defendant cited the roofing called "Slateoid," manufactured by the Trinidad Asphalt Mfg. Co. of St. Louis. This word was registered as a trademark by the company in 1906. It appears that A. C. Hall was employed by the Staso Mills, or Staso Milling Co., of Boston, Mass., as its superintendent from 1906 to 1913. That company was making slate dust in 1906 which was used in making paint and linoleum. This dust had to be screened, and it occurred to Mr. Hall that the larger screenings would make a good material for roofing.

He sent samples to various roofing manufacturers, among whom was the Trinidad Asphalt Mfg. Co. It approved the material and ordered two carloads. The factory of the Staso company was therefore equipped for crushing slate ordered by the Trinidad company. Eight carloads was shipped to that company. The Staso company called the material "torpedo slate." The Trinidad company made and sent samples of Slateoid to the Staso company, and these samples were, Hall testified, like the material manufactured by the Staso Laminated Slate Co. and submitted to him at the trial.

The Trinidad company showed that it manufactured and sold 9394 squares of "Slateoid," enough to cover 1657 average size houses, before September 9, 1908, which was two years before the application for the Schroder patent. On March 21, 1907, Frank W. Torpening, of the Trinidad company, filed an application for a patent on the Slateoid roofing made by his company. Claim 2 specifies: "A roofing sheet comprising a pliable body, a non-hardening bond applied to said body, and a layer of crushed slate imbedded in said compound, substantially as set forth."

Earlier Application for Patent on Identical Material Rejected

This application was rejected by the Patent Office on the ground that substitution of crushed slate for other material did not constitute invention. This application was filed 3½ years before the Schroder application, using the identical material, crushed slate, and applied in identically the same way.

Complainant disposed of the Trinidad roofing by saying that it was only an experiment and a complete failure, that its manufacture was abandoned, and therefore it should not be held as an anticipation. The court, however, held that such conclusions were not justified by the evidence. It found that substantially the same roofing was successfully manufactured out of the same material, by the same method as described in the Schroder patent more than two years before his application. Hence the patent in suit was anticipated and invalid.

The enterprise of the patentee and his assignee was commercially successful. The roofing has been applied in large quantities, both in the form of sheets or roll roofing or shingles. Commercial success is often indicative of invention, but it is not always so, for it may be due to other causes, said the court.—*Chemical and Metallurgical Engineering.*

FIRST NATIONAL SLATE MEETING

THE first national meeting of the National Slate Association will be held at the Hotel Commodore, New York City, on April 20.

Underground Mining for Slate

ALTHOUGH open-pit quarrying is the most common method for obtaining slate, underground mining is followed under certain conditions, states Oliver Bowles, mineral technologist of the Bureau of Mines. Underground methods are now used at Monson and have been followed near Delta, Pa., and West Pawlet, Vt. The mine at Delta was abandoned some years ago, and work was suspended at West Pawlet during the recent war.

Underground methods have been used more extensively in foreign countries, both in Wales and on the Continent, a famous example being the slate mines at Angers in France, where an overhead stoping method has been used successfully for many years. The French mines are probably the most widely known on account of their unusual methods, but it is claimed the Oakley quarry in North Wales is the largest underground slate operation in world; slate has been removed from 26 levels. It has 50 miles of railroads, 4 miles of pump mains, and 12 miles of compressed-air mains.

Only under special conditions can underground methods be successfully used. If the deposit is wide and relatively thin, or if the material is too unsound to form a safe roof, open-pit methods must be used, for slate is too low-priced a commodity to justify the heavy expense of timbering. Only where the deposit is relatively narrow, of great depth, and sufficiently sound to afford a strong roof can ordinary mining be followed.

Cement Trade of Egypt

A LATE review of the cement situation in Egypt, where the local production prior to 1914 was but 20,000 tons of the 100,000 annually required, shows a great increase in cement of home manufacture:

The Societe des Ciments d'Egypte and Nassanh has increased its facilities and improved its processes of manufacture to an extent permitting an annual output of 30,000 tons. Enormous quantities of raw material and low labor costs are factors making it possible for this company to practically control cement imports into Egypt, as it can regulate its schedule of rates to the basis of European selling prices.

Despite the high price of British cement, English importations were valued at about £E60,000 in 1921, against £E112,000 in 1920. The decrease is explained by the requirements of certain earlier state contracts the specifications for which called for English cement.

Before the war Belgium occupied first place in the Egyptian cement market. That source of supply is now handicapped by high freight rates and the action of the Societe des Ciments d'Egypte in lowering its price to a point below that of the Belgian product.

Cement of Dalmatian production, financed for the most part by Italian capital, holds the most important place in the Egyptian import market, due to its low price. Dalmatian natural cements comply with usual specification requirements, but do not offer the guarantees of artificial cement, although known as "rectified natural cement."—*Commerce Reports.*

Charles Warner Co. Establishes Florida Branch

THE Charles Warner Co., Wilmington, Del., is establishing an extensive branch of its business in Miami, Fla., and plans to supply building materials to contractors at that rapidly growing Southern winter resort.

The building materials will be shipped from Wilmington to Miami by steamers as soon as the new Marine Terminal on the south bank of the Christiana is opened to traffic. The vessels will sail directly from its wharves, thus establishing a regular coastwise trade line with Wilmington as its home port.

Arrangements for the new branch at Miami have been in the making for several weeks past. President Warner, who has been in Florida, discovered the opening for a building supply trade and at once laid plans for supplying the demand, which has grown to large proportions with the development of the Florida city.

As a member of the Board of Harbor Commissioners and one of the most ardent supporters of the new Marine Terminal project, Mr. Warner also saw the opportunity of developing trade for it with Southern ports by combining the shipment of building supplies by the company with a steamship line operating from the Christiana river.

Who Wants to Manage a Quarry in Italy?

THE EDITOR: A certain company in Italy owns a large rock quarry, which rock carries a big percentage of asbestos. It is first crushed in order to extract the asbestos which is sent down to the coast for making asbestos tiles and sheets, for which there is a big demand. These people are making considerable extensions to their crushing plant but require a shovel for the handling of stone before it is conveyed to the crusher.

We have been following the matter quite vigorously and it now looks as if we can persuade them to try one of our small shovels for this work. However, they have asked us if we could get hold of a good foreman who would be capable of organizing and running their quarry—who should be familiar with the most up-to-date methods of quarry management. They also ask what salary such a man would require. Could you give us some idea of what salary would be required as an average for a man able to undertake these responsibilities? Would you also be willing to offer suggestions as to how we might best take steps to find such a man for our Italian friends?

A ROCK PRODUCTS ADVERTISER.

This looks like a good opportunity for a foreman or superintendent of Italian origin and American quarry experience. We will be glad to hear from readers who know such a man.—The Editor.

American Lime and Stone Company Completes New Kiln

A NEW kiln with a capacity for burning 200 tons of lime daily has been completed at the Bellefonte, Pa., plant of the American Lime and Stone Co., which is affiliated with the Charles Warner Co., of Wilmington, Del. This completes the first unit of the new lime plant at Bellefonte; the unit has cost more than $1,000,000. With this addition the output of the combined companies will be increased about 25 per cent.

While there has been between 60 and 70 upright lime burning kilns at the Bellefonte plant, this is the first continuous revolving horizontal kiln at that plant. Formerly the limestone was dumped into the kiln at the top and after it was burned and transformed into lime, it was raked and shoveled out at the bottom.

Under the new process the kiln consists of a huge iron cylinder 8 ft. in diameter and 150 ft. long, lined with firebrick. The raw limestone is dumped in at one end and with the aid of a little grade for the kiln the limestone is gradually worked through the rotary process and grade to the end of the kiln, where it comes out as lime. Not only does the new kiln have a larger capacity and is more convenient to operate, but it is a great labor-saver.

This kiln is placed so that the limestone coming from the deposits of the American Lime and Stone Co. enter first the crushing mill, then to the screening house and into the kiln, and then to the hydrating house where the lime is slaked.

This kiln marks a new construction record at the Bellefonte plant. Bad weather has been a severe handicap but the kiln has been constructed very quickly, and will be ready for operation in time for the spring trade. The Charles Warner Co. has had a smaller rotary kiln in operation at Cedar Hollow for several years.

Comparison Made on Prices of Cement

THE Cement Information Service has recently issued a statement of the facts concerning cement prices, profits, production and distribution, in reply to charges brought against the cement industry as a whole. It is stated that during the early part of 1915 some companies sold cement at 60 cents a barrel at their mills—a price admittedly below cost. Never before in the history of the industry had cement prices dropped so low. Many manufacturers refused to sell their product at that figure. Being confronted with serious financial difficulties, some plants were obliged to close. In reference to this, the Cement Information Service states that it is not fair to take the price of a commodity at an abnormally low point and during a temporary period as an indication of what a reasonable price should be.

A comparison between the price of cement and that of other building materials indicates that the price of cement did not rise to the high point reached by other building materials. Cement prices are therefore extremely low, considered relatively or absolutely. Let us compare today's price of the essential elements in the cost of cement with the price in 1914: Coal per ton delivered at the cement mill in 1914 cost $2.45. Coal now costs $6 per ton. Labor in cement plants in 1914 received on the average 20.1 cents an hour and now receives an average rate of about 42 cents an hour. Gypsum per ton at plant in 1914 cost $2.75. It now costs $6.20 per ton. Bags per 1,000 in 1914 cost about $82. Now bags cost about $215 per 1000, due to the rise in the price of cotton from 7 cents a pound in 1914 to about 30 cents a pound today, and it takes four bags to make a barrel of cement.

Selling expense is also an important item in the cost of cement. Nineteen Eastern companies report that selling expenses increased on the average from 6.4 cents per barrel in 1914 to 12.5 cents per barrel in 1921. When existing conditions are taken into consideration, present figures for cement compare very well with those prevailing in 1915.—*Chemical and Metallurgical Engineering.*

Phosphate Along Red Sea Coast

ALTHOUGH phosphate deposits have been discovered at many points in Egypt, those along the Egyptian coast of the Red Sea are the only ones of present-day commercial importance. "The deposits at Kosier, El Karn, El Hamama, El Sibaia, and Sofaga are known to be valuable," states the *Bulletin du Canal de Suez.* The last named (Sofaga, 18 miles from the coast) is being developed at present by an English company; the deposit is said to contain over 58 per cent of tricalcate phosphate and to be of high value as fertilizer.

The mine, which employs at present about 2000 workmen, ships its product to the coast by means of an electric railroad, and practically all of the product is being exported to Japan at present. Japanese and English steamers, having delivered Oriental cargoes in European ports, return and transit the Suez Canal in ballast, with a saving of 2.50 francs per net ton in canal tolls, and load phosphate at Sofaga for Japanese ports. The annual production is about 125,000 tons.

The deposits at Koseir and El Sibaia are being exploited by an Italian company, which exports the product to Italy. Phosphate cargoes shipped northward through the canal from this source amounted to 28,000 tons in 1919, 69,000 tons in 1920, 35,000 tons in 1921, and 8000 tons in the first nine months of 1922.

Traffic and Transportation

By EDWIN BROOKER
Munsey Building, Washington, D. C.

Freight Rates on Slag Again Under Attack

PRODUCERS of sand and gravel in western Pennsylvania have decided to petition the Pennsylvania Public Service Commission to reopen Complaint Docket No. C-3597, which was filed in 1920 alleging unjust and unreasonable rates on sand and gravel between points in western Pennsylvania; also alleging discrimination in the rates on these commodities as compared with slag. The commission, after a complete investigation of the matter in 1921, did not take action thereon in any way, but marked the record closed without prejudice to the rights of the producers to reopen the complaint in case the railroads did not make prompt and satisfactory rate adjustments.

The carriers at that time had promised the commission to make a voluntary reduction of 18 per cent in the rates on sand and gravel between points in western Pennsylvania. At that time the Interstate Commerce Commission were also overturning the decisions of the various state commissions which had established lower rates on intrastate traffic than those in effect on interstate traffic on the grounds of discrimination against the latter. Whether this prompted the commission to take the action it did at that time is a matter of conjecture, but some strong influence was used then to prevent a decision in the matter.

In the decision of the Interstate Commerce Commission in the Central States Complaint Docket No. 13231, made public in January, 1923, reference was made to the admission by the carriers that the rates on slag should not be less than in effect on sand and gravel, but attention was called to the fact that it was chiefly an intrastate matter not under their jurisdiction. The railroads during the hearing before the Interstate Commerce Commission in ExParte 74, during 1920, made a similar admission. It is a matter of speculation as to what justification they can now give for publishing lower rates on slag between points in western Pennsylvania on intrastate traffic.

The minimum rates on sand and gravel in this territory are the basis of 60, 70 and 80 cents per ton, whereas on slag the railroads publish a minimum rate of 45 cents per ton. An equalization of the rates on these commodities will mean a complete change in the rate fabric in western Pennsylvania and it is not expected that the carriers will be able to justify an increase in the slag rates to the present level of rates published on sand and gravel.

The fight at this time is under the direct charge of Alex W. Dann, of the Keystone Sand and Supply Co., who is also vice-president of the Pennsylvania Sand and Gravel Producers' Association. Edwin Brooker of Washington, D. C., has been retained to assist in the handling of the proceedings.

The Southern Railroad Mileage Scale

THE railroads in Southern territory have for the past few years strongly advocated the establishment of a uniform mileage scale basis of rates on sand and gravel, crushed stone and slag between all points, and in 1921 and 1922 submitted proposals to the Georgia and Alabama commissions for such a basis. The railroads have met with considerable opposition to this movement from all quarters, but during this period have used the proposed scale in numerous instances in establishing new commodity rates between Southern points.

The Southern Railroad is the only large carrier in the South which has issued a tariff naming this scale, and it is now used as a maximum basis in cases where commodity rates are not published. Inasmuch as the entire rate structure on sand, gravel, crushed stone and slag, will occupy the attention of producer and railroads alike during the next year, one or two observations in connection with such scale may be of interest to the producers.

The Southern Railroad System is comprised of the Southern Railroad proper and various lateral lines. It is in reality one large railroad from an operating point of view and the identity of some of the lines, such as the Alabama Great Southern, the Cincinnati, New Orleans & Texas Pacific, the Georgia Southern & Florida, the New Orleans & Northeastern, and the Northern Alabama, are only maintained for accounting purposes.

In its application of the mileage scale as published on sand, gravel, crushed stone and slag, each line maintains its separate identity and if traffic originates on one line of the Southern Railway system and is destined to another line of the same system, it is regarded as a movement over two lines and not a movement over one railroad. The result of this application of the Southern Railroad mileage scale makes the rates higher where a movement is over two of the railroads comprising the Southern Railway System than the single-line mileage scale. The application of a reasonable differential over a single-line mileage scale may be justified in cases where two railroads, foreign to each other in their operation and management, but is not proper where the railroads are operated and managed as a single railroad.

A comparison of the single and two-line mileage scales will show the difference in the rates due to the application of the scale in this manner. The rates are shown for only some of the distances:

Miles	Single line scale	Two line scale
5	$0.45	$0.77
10	.50	.77
20	.59	.86
40	.77	1.04
60	.90	1.17
80	.99	1.22
100	1.08	1.31
120	1.17	1.40
140	1.26	1.49
160	1.35	1.58
180	1.40	1.58
200	1.44	1.62
220	1.49	1.67
240	1.53	1.76
260	1.58	1.76
280	1.62	1.76
300	1.67	1.80

The difference between the single-line rates and those shown for two lines represents the amounts which the Southern Railway are charging and assessing to which they are not entitled.

In Royster Gunao Co. vs. A. C. L. R. R. et al., the Interstate Commerce Commission in establishing a mileage-scale basis on fertilizer for single-line hauls specified that the single-line basis should also apply over two or more lines that are under the same management and control. If this principle is established on fertilizer, is it not fair to apply the same rule in connection with sand, gravel, crushed stone and slag and should not the single-line-haul mileage scale now in effect on the Southern Railway apply to any point on the lines comprising that system?

There is no difference in the handling at Chattanooga yards on a shipment originating on the Knoxville Division of the Southern Railway destined to a point on the Alabama Great Southern Railroad, than there is on a shipment originating at a point on the Alabama Great Southern destined to a point on the same railroad, south of Birmingham, Ala., which is also handled through the Birmingham yards. The Southern Railroad in effect handles the shipments at both points, but on the former charge rates based on the two-line scale and on the latter the single-line scale.

The Georgia Commission has recently issued an order directing the Southern Railway and the Georgia, Southern & Florida to apply continuous mileage rates on all freight handled jointly by these roads after April 1, 1923. The commission assigned as the reason that the Georgia, Southern & Florida is operated as a part of the Southern System and that for all practical pur-

poses there is no distinction between them. The Southern Railway contended, as they do in connection with the mileage scale rates on sand and gravel, etc., that though this road is in name a part of the Southern Railway System, it is in reality a separately owned and chartered property, and therefore the continuous mileage rates should not apply.

It would seem that nothing remains for the producers in the South to do, particularly those located at points on the Southern Railway System, but to insist on the application of the one-line scale to all points on the Southern Railway System which will mean a decided reduction in rates on shipments now moving over two or more railroads comprising that system.

Proposed Changes in Rates

Central Freight Association

5992. Crushed stone and stone screenings, from Perkins Spur (McCrays Quarry), Ind., to the following points:

To	Present rate	Proposed rate
Lafayette, Ind.	$1.13	$1.01
Montmorenci, Ind.	1.04	1.01
Otterbein, Ind.	1.13	1.01
Templeton, Ind.	.98	.94
Oxford, Ind.	.98	.94
Chase, Ind.	.98	.94
Boswell, Ind.	.98	.94
Talbot, Ind.	.98	.94
Ambia, Ind.	.98	.90
Cheneyville, Ill.	.98	.90
Hoopeston, Ill.	.98	.90
East Lynn, Ill.	1.13	.90
Rankin, Ill.	1.13	.90
Clarence, Ill.	1.13	.90
Paxton, Ill.	1.13	.90

5995. Crushed stone, from Greencastle, Ind., to Midland, Conlague and Dudley, Ill., present, 86 cents; proposed, 88 cents per net ton.

5997. Crushed stone, from Kenneth, Ind., to Sedley, Ind., present, $1.50; proposed, $1 per net ton.

6023. Crushed stone and stone screenings, from Marblehead, Ohio, to Erie, Pa., present, $2.52; proposed, $1.40 per net ton.

6024. Lime, from Milltown and Marengo, Ind., to Columbus, Ohio, present, 19 cents; proposed 14½ cents per 100 lb. To Newark, Ohio, present, 23½ cents; proposed, 16½ cents per 100 lb.

6026. Crushed stone, from Kenneth, Ind., to Michigan City, Ind., present, $1.27; proposed, $1 per net ton.

6031. Crushed stone, from Silica, Ohio, to various points, some of which are as follows:

To	Present rates	Proposed rates
Chesterton, Ind.	$1.84	$1.89
Chicago, Ill.	1.84	1.89
Dundee, Mich.	.81	.88
Elkhart, Ind.	1.26	1.18
Fort Wayne, Ind.	1.13	1.06
Goshen, Ind.	1.25	1.06
Millers, Ind.	1.84	1.89
Osceola, Ind.	1.30	1.32
Pettisville, Ohio	.70	.65
Plainwell, Mich.	1.73	1.84
Pleasant Lake, Ind.	1.10	1.06
Schoolcraft, Mich.	1.61	1.73
Ypsilanti, Mich.	.88	1.01

6033. Sand and gravel, from Lafayette, Ind., to West Kankakee, Greenwich, Vans Siding, Lehigh, Goodrich, Union Hill, Reddick, Blair and Dwight, Ill., present, sixth class; proposed, 88 cents per net ton.

6043. Sand and gravel, from Macksville, Ind., to Greenup, Ill., present, 84 cents; proposed, 76 cents per net ton.

6044. Crushed stone, from New Paris, Ohio, to Washington Court House, Ohio, present, $1.20; proposed, 90 cents per net ton. To Chillicothe, Ohio, present, $3.40; proposed, $1 per net ton.

6045. Cement, from Buffington, Ind., and South Chicago, Ill., to Cincinnati, Ohio, on shipments destined to Kentucky points, present, 14 cents; proposed, 10 cents per 100 lb.

6046. Sand and gravel, from Grayville, Ill., to Poseyville, Ind., present, 69 cents; proposed, 63 cents per net ton.

6058. Sand and gravel, from Terre Haute and Summit Grove, Ind., to Albion, Ill., present, $1.26; proposed, $1.10 per net ton.

6059. Cement, from Universal and Newcastle, Pa., districts to Cincinnati, Ohio, on shipments destined to points in Kentucky, to which no through rates are in effect, present, 15½ cents; proposed, 12½ cents per 100 lb.

6064. Ashes, cinders and slag, from Youngstown, Ohio, to Botzum, Ohio, present, 90 cents; proposed, 80 cents per net ton.

6078. Crushed stone, from Greenfield, Ohio, to stations on the C. C. C. & St. L. Railway in Ohio, present rates, sixth class. Proposed rates are as follows:

To	Rates
Cincinnati Division	
Milford Centre to Catawba, Ohio	$ .90
Harshman to Middletown, Ohio	.90
Moorefield to Osborn, Ohio	.80
Monroe to Cincinnati, Ohio	1.00
C. & S. Division	
Galloways to Plattsburg, Ohio	.90
Brooks, Ohio	.80
Sandusky Division	
Bellefontaine to Urbana, Ohio	.90
Bowlusville and Glen Echo, Ohio	.80
P. & E. Division	
Durbin to Donnelsville, Ohio	.80
New Carlisle to Ludlow Falls, Ohio	.90

6079. Moulding sand, from James Siding (Belmar), Pa., to Newcastle, Pa., $1.50; to Sharon, Pa., $1.38; to Sharpsville, Pa., $1.38; to Warren, Ohio, $1.50; to Cleveland, Ohio, $1.61 per net ton.

6080. Crushed stone, from Lima, Ohio, to stations on the C. C. C. & St. L. Railway in Ohio, present rates, sixth class. Proposed rates are as follows: Indianapolis division, Larue to Mt. Victory, inclusive, Dawn to Elroy, inclusive, 90 cents per net ton; Ridgeway to DeGraff, inclusive, Pemberton to Versailles, inclusive, 80 cents per net ton; Sandusky division, West Liberty to Lippincotts, inclusive, 80 cents, and Urbana to Glen Echo, inclusive, 90 cents per net ton; Cincinnati division, Irwin to Harshman, inclusive, 90 cents per net ton; C. & S. branch, Lilly Chapel to Brooks, inclusive, 90 cents per net ton; P. & E. division, Durbin to Grayson, inclusive, 90 cents per net ton.

6082. Cement, from Mitchell, Ind., to Cincinnati, Ohio, applicable on traffic to points south of the south bank of the Ohio river to which no through rates are published, except to the following points in Kentucky: Altamont, Andrews, Bellevue, Brent, Central Covington, Covington, Crescent Springs, Dayton, Erlanger, Highland, Latonia, Dudlow, Newport, Silver Grove, Water Works and Wilder. Present rate, 10 cents; proposed rate, 9 cents per 100 lb.

Central Freight Association

6107. Crushed Stone, Crushed Stone Screenings and Agricultural Lime Stone (not ground or pulverized), Bedford, Dark Hollow, Clear Creek, Mitchell, Oolitic, Coxton, Ind., to Shipshewana, Twin Lake and Middlebury, Ind., present, sixth class; proposed, $1.72 per net ton.

6122. Sand (except Loam Sand) and Gravel, South Heights, and Woodlawn, Pa., to Nemacolin, Pa., present, combination of local rates; proposed, $1.40 per net ton.

6124. Caustic Soda, Belle, Hartford and Mason City, W. Va., to Memphis, Tenn., Helena, Ark., Greenville, Vicksburg and Natchez, Miss., New Orleans, La., and points taking same rates.

	Present	Proposed
Memphis, Tenn.	32	34½
Helena, Ark.	39	42
Greenville, Miss.	39	42
Vicksburg, Miss.	39	42
Natchez, Miss.	40½	42½
New Orleans, La.	42½	44

6139. Cement, Buffington, Ind., and South Chicago, Ill., to Kentucky points, to

	Present	Proposed
Central City	25	19
Fordsville	24	22½
Gracey	22½	21
Hopkinsville	22½	21
Nortonville	22½	19
Morganfield	21½	19
Elizabethtown	20½	17

6140. Sand and Gravel, Richmond, Ind., to Brice, Ind., present, 13½ cents, proposed, $1 per net ton.

6143. Sand and Gravel, Ginger Hill and Rupel, Ind., to Wilton, Ill., present, $3 per net ton, proposed, 88 cents per net ton.

6144. Stone, viz.; Crushed, riprap, rough (not dimension or dressed) and rubble, Kankakee and Lehigh, Ill., to points on C. A. & S. Ry., to:

	Present Rates	Proposed Rates
Burkes	$1.01	$1.00
Dunns	1.01	1.00
Zadoc	1.01	.89
Kniman	1.01	.89
Virgie	1.01	.89
Fair Oaks	1.01	.89
Kents	1.01	.89
Mount Ayr	1.01	.80
Julian	1.01	.80
Porseman	1.01	.80
Percy Jct.	.86	.76
Goodland	1.01	.80
Wadena	1.01	.89
Lochiel	1.01	.89
Barce	1.01	.89
Swanington	1.01	.89
Oxford	1.01	.89
Sand Spur	.87	.76
Elmer	.87	.76
Pogue	.88	.76
Beaver City	.88	.76
Brook	.88	.76
Weishaars	.88	.76

6152. Crushed Stone and Crushed Stone Screenings, in bulk, Mitchell, Ind., to Birds and Pinkstaff, Ill., present, 15 cents; proposed, $1.05 per net ton.

6159. Cement, Bay City and Port Huron, Mich., to Lower Peninsula of Mich., present, sixth class; proposed, illustrations:

To points in Michigan	From Bay City	From Port Huron
Adrian	13	12
Alpena	11	13
Battle Creek	12	12½
Cadillac	12	14
Cassopolis	13	13½
Detroit	11	9
East Jordan	12½	15½
Grand Rapids	12	12½
Grayling	11	13
Hillsdale	13	13
Jackson	11½	12
Lakeland	11½	11
Manistee	12½	14½
Mt. Pleasant	10	12
Owosso	9½	11
Petoskey	13	15½
Reed City	12	13
Saginaw	7	11
Sanduskey	10	10
Toledo, Ohio	13	12
White Pigeon	13	14
Wyandotte	12	11½

6160. Sand (other than Blast, Engine, Foundry, Glass, Moulding or Silica), and Gravel, New Albany, Ind., to Greensburg and McCoy, Ind., present, $1.38 and $1.50 per net ton; proposed, $1.15 per net ton.

6163. Ashes, Cinders (except Mill Cinders and Pyrite Ore Cinders), and Slag, Lorain, Ohio, to Akron and Botzum, Ohio, present, 90 cents per net ton; proposed, 80 cents per net ton.

Illinois Freight Association

1393B. Lime, minimum weight 60,000 lb., to revise rate of 10½ cents per 100 lb., from Mosher and Ste. Genevieve, Mo., to Peoria, Ill.

1689. Gravel from Joliet, Ill., to Deer Creek, Ill., proposed, $1.16 per net ton.

1697. Crushed Stone, Sand and Gravel, C. L., min. wt. marked capacity of car, 88 cents per net ton of 2000 lb., from Joliet, Ill., district to Rutland, Ill.

1550B. Cement, Hydraulic, Portland or Natural, C. L., 16 cents per 100 lb., from Buffington, Ind., to Marion, Ill., via E. J. & E. and C. & E. I. or E. J. & E. and I. C. for Marion & Eastern delivery.

1707. Molding Sand, C. L. min. wt. 90 per cent of marked capacity of car, $2.50 per net ton from Tamalco and Keyesport, Ill., to Lake Mills, Wis., and from Keyesport, Ill., to Fort Atkinson, Wis.

1713. Crushed Stone, Sand and Gravel, C. L., min. wt. marked capacity of car, $1.05 per net ton from Joliet district to L. E. & W. Ry. station between Peoria, Ill., and Bloomington, Ind.

1719. Sand and Gravel, C. L., min. wt. capacity of car, $1.26 per net ton from Metropolis, Ill., to Aviston and Trenton, Ill., viz., I. C., Sandoval, Ill., and the B. & O.

1723. Sand, C. L., min. wt. 90 per cent of marked capacity of car, $1.60 per net ton from Muscatine, Iowa, to Milwaukee, Wis.

New England Freight Association

4259. Common lime, from Cavendish Center, Rutland, Danby, Leicester Junction and New Haven Junction, Vt., to other stations on the Rutland railroad on a mileage scale based on 80 per cent of sixth class Anderson B scale with maximum of 16 cents per 100 lb.

4276. Sand, blasting, core, fire and sea, from Madison, Conn., to Harlem River, N. Y., proposed 10½ cents per 100 lb. It is proposed to place shippers at Madison, Conn., on a parity with other shippers in contiguous territory.

4288. It is proposed to cancel Items 479 and 489 of B. & M. I. C. C. No. A2417, applying on sand, gravel, crushed stone, etc., transported wholly within the state of New York and allow the rates applicable on interstate traffic published in Items 477 and 487 of same tariff to apply.

The intention is to apply a uniform basis on state and intrastate traffic.

4333. Stone, crushed, and articles taking same rates, C. L., min. wt. 90 per cent of marked capacity of car except when cars are loaded to cubical or visible capacity actual weight will apply, Westfield (Hampden quarry), Mass., to Holyoke, Mass., 70 cents per net ton. Reason: to meet motor truck competition.

Trunk Line Association

11128. Lime, building, minimum weight 30,000 lb., from Bellefonte, Pleasant Gap and Naginey, Pa., to points on the Pennsylvania railroad and rail stations on the B. C. & A. railroad and M. D. & V. railroad, Farmhurst, Del., Ocean City and Queen Anne, Md., Portsmouth, Va., and other points, proposed rates from 12 to 17½ cents per 100 lb.

11135. Crushed stone, in bags, from Harrisburg, Pa., to Dover, Del., and Salisbury, Md., proposed rates, 22½ and 25 cents per 100 lb., respectively.

11172. Sand (other than Blast, Engine, Glass, Molding, Foundry or Silica), C. L.; (2) Sand (Blast, Engine, Glass, Foundry, Molding or Silica) C. L., min. wt. 90 per cent of marked capacity of car, etc., from Cape May, Penbryn, Radix, Stone Harbor, Wildwood-Holly Beach, Williamstown and Williamstown Junction, N. J., to Petersburg, Va., rates (1), $4.76; (2), $5.28 per 2000 lb.

11176. Lime, all kinds, C. L., min. wt. 30,000 lb., from Martinsburg-Strasburg Junction-Frederick district, to Yonkers, White Plains and Tuckahoe, N. Y., rate 25 cents per 100 lb.

11179. Cement, Common, Hydraulic, Natural or Portland, C. L., min. wt. 50,000 lb., except when for carrier's convenience cars of less capacity are furnished, in which case min. wt. will be the marked capacity of car furnished, but in no case less than 40,000 lb., from Glens Falls, and Howes Cave, N. Y., to stations and B. R. & P., Lincoln Park, N. Y., Bradford, West Line, Pa., and other points, rates 16 to 17 cents per 100 lb.

11186. Cement, C. L., min. wt. 50,000 lb., except when car of less capacity is furnished for carrier's convenience in which case the marked capacity of car will be the min. wt., but in no case less than 40,000 lb., from Manheim, W. Va., to Bison and West Sutton, W. Va., rate 14½ cents per 100 lb.

M311. To establish rate on cement, min. wt. 50,000 lb., etc., Lehigh and Hudson districts to Wilmington, N. C., Charleston, S. C., Brunswick and Savannah, Ga., and Jacksonville, Fla., 24 cents per 100 lb.

11206. Cement, Common, Hydraulic, Natural or Portland, C. L., min. wt. 50,000 lbs., except when for carrier's convenience cars of less capacity are furnished, in which case min. wt. will be marked capacity of car furnished, but in no case less than 40,000 lb., from stations on the C. R. R. of N. J., L. & N. E., and N. & B., to stations on the Chestnut Ridge Ry., 7½ cents per 100 lb.

11207. Cement, Common, Hydraulic, Natural or Portland, C. L., min. wt. 50,000 lb., except when for carrier's convenience cars of less capacity are furnished, in which case min. wt. will be marked capacity of car furnished, but in no case less than 40,000 lb., from stations on the Lehigh district to points on the C. & O., 23 to 26½ cents per 100 lb.

11214. Lime, Common or Slack, C. L., min. wt. O. C., Steuben, Pa., to Lehigh Valley Ry. Stations, Phillipsburg, N. J., to Bethlehem, Pa., inclusive, including stations on the E. & N. branch, Easton to Belfast, Pa., inclusive, 7½ cents per 100 lb.

Southern Freight Association

8943. Lime, from Concord, Tenn., to destinations shown in Agent Glenn's I. C. C. A380 except points in the state of Tennessee, east of Harriman and Chattanooga, to which rates are published from Knoxville, Tenn. It is proposed to establish rates same as currently in effect from Knoxville, Tenn.

8948. Crushed stone, from Whitestone, Ga., to Birmingham and points in the Birmingham group. Present rates to Birmingham $2.20 and to Birmingham group points, $2.14 per net ton. It is proposed to establish rate of $1.80 per ton to all the points which is made in relation to the rates from Tate, Ga., and Mascot, Tenn.

8955. Crushed stone, from Ball Mountain, N. C., to Jacksonville, Fla., at present no commodity rates in effect. Proposed rate, $2.21 per net ton, which is on basis of scale of commodity rates submitted to the Georgia and Alabama commissions on crushed stone.

8995. Broken stone, from Sherwood, Tenn., to Chattanooga, Tenn., present rate 90 cents; proposed rate, 78 cents per net ton.

9019. Slag, from Copperhill, Tenn., to points in North Carolina, South Carolina, Florida and Georgia. Present rates combination of locals. Proposed rates made in line with rates from and to other points in the same general territory.

9024. Slag, from Birmingham and group points to East Point, Lakewood Station and Oakland City, Ga., present rate $1.02 per ton. It is proposed to restrict this rate so as not to apply via the Southern railway, allowing combination of rates to apply via the latter route.

9027. Slag, from Copperhill, Tenn., to points on the L. & N. railroad. Present rates are out of line with rates in effect to other points, and it is proposed to establish the following rates: Atlanta division: Keithsburg to Elizabeth, Ga., $1.02; to Murphy Branch, rates range from 80 to 90 cents; to W. & A. railroad branch, Emerson, Ga., to Bolton, Ga., $1.02; to Cow Creek branch, Marlow to Windrock, Tenn., $1.40; to H. K. & E. railroad branch, Lantz to Webster, Tenn., $1.40, and to Athens and Tellico branch, rates range from $1 to $1.20 per net ton.

9042. Crushed stone, from Cerulean, Hopkinsville, and Cedar Bluffs, Ky., proposed to Mt. Vernon, Ind., $1.23; to Cadorn, Oak Grove Road, Hogue Road and St. Phillips, Ind., $1.19 per net ton. At present combination of locals apply.

9057. Cement, from Kingsport, Tenn., to Trinity, Ky., present, 17½ cents; proposed, 15½ cents; to Manchester, Ohio, at present no through rates in effect, proposed 20½ cents; to New Richmond and South Ripley, Ohio, present, 17½ cents; proposed, 20½ cents per 100 lb.

9090. Cement, from Chattanooga, Tenn., to Cincinnati, Ohio, Louisville, Ky., and Lexington,

9093. Cement, from Kingsport, Tenn., to points on the Big Sandy and Cumberland railroad. Present and proposed rates are: To Lower Elk, Hurricane, Middle Elk and Camp Creek, Ky., present 18 cents, proposed 23 cents; Kelsa, Va., present 19½ cents, proposed 24½ cents; Guesses Fork, Hurley, Blackey and Wolford, Va., present 20½ cents, proposed 24½ cents; to Matney, Riley, McLanahan, Healing Springs, Hobbs Branch and Bee Hive, Va., present 21½ cents, proposed 25½ cents; to Harpers Branch and Grundy, Va., present 23 cents, proposed 27 cents per 100 lb.

9090. Crushed stone, from Whitestone, Ga., to Atlanta, Ga. Present rate is on basis of $22.50 per car. Proposed rate 90 cents per net ton, which is made in relation to rate of 81 cents per ton from Fairmount and Bolivar, with distances of 10 and 14 miles, respectively, less than from Whitestone.

9140. Lime, from Fishers Hill, Linville, Riverton, Strasburg, Strasburg Junction, Toms Creek, Woodstock and Zirkle, Va., to Boston, Mass., and points on the N. Y., N. H. & H. railroad and Boston & Albany railroad to which Boston group rates now apply on other commodity as per Southern railway, I. C. C. A9199. Present rate 40½ cents, proposed rate 25 cents per 100 lb.

9143. Cement, from Birmingham, North Birmingham and Leeds, Ala., Portland, Ga., Ragland, Ala., Richard City, Tenn., Rockmart, Ga., and Spocari, Ala., to Snow Hill, N. C. It is proposed to revise present rates to same basis as to Maury, N. C.

9148. Proposed minimum weight of 90 per cent of the marked capacity of the car, except when cars are loaded to full visible capacity, actual weight will apply.

9261. Slag, min. wt. 60,000 lb., but not in excess of marked capacity of car, C. L., from Alabama City, Attalla and Gadsden, Ala., to Georgia railroad stations, Robinson, Ga., to Wheless, Ga., inclusive. It is proposed to reduce the present rates to be the same as in effect from Birmingham, Ala. Present rates range from $2.22 to Robinson, to $2.30 per net ton to Wheless. Proposed rate, $1.80 per net ton.

9280. Stone, Broken, Crushed, Rubble and Ballast, C. L., from Madisonville, Ky., to Evansville, Ind., present rate 7 cents per 100 lb. ($1.40 per net ton); proposed rate, 90 cents per net ton, same as from Hopkinsville, Ky., to Evansville.

9282. Cement, C. L., from Cosmosdale, Ky., to Elkhart, Ind., present rate, 36 cents per 100 lb. (Louisville combination), proposed rate 13 cents per 100 lb., same as currently in effect to South Bend, Ind.

Western Trunk Line Committee

2981. Lime, from Missouri river, Mississippi river, Peoria, Chicago, St. Paul, Duluth, Memphis and points taking same rates. It is proposed to establish a minimum weight of 30,000 and 40,000 lb. in connection with Items 1435 and 1440 of W. T. L. Tariff 111C to Colorado common points.

2992. Cement, from West Keithsburg, Ia., when originating east of the Illinois-Indiana state line to Des Moines, Ia., and Highland Park, Ia. Present rate, 12 cents; proposed rate, 10½ cents per 100 lb., subject to Kelly's Tariff 228.

Southwestern Freight Bureau

7798. Gravel. To establish rate of $2.065 per ton of 2000 lb. on gravel, carloads, from Davis and Pearson, La., to Houston, Texas. Remarks: It is claimed that present Class E rate is too high to permit movement of this traffic.

7832. Limestone (crushed or ground). To establish rate of 30 cents per 100 lb. on Limestone, carloads, min. wt. 80,000 lb., or marked capacity of car if less, from White Cliffs, Ark., to New York, N. Y., via Gulf. Remarks: It is claimed the present class rates on this traffic are too high to permit movement.

7833. Sand, Gravel and Crushed Stone. To establish rate of 5 cents per 100 lb. on sand, gravel and crushed stone, carloads, from Dear, La., on the L. & N., to Texas points on the T. & N. O., Kountze to Voth, inclusive. Remarks: It is claimed the proposed change is desired in order to place the Southern Pacific on a parity with other lines.

7841. Cement, Portland and Hydraulic. To establish rate of 14½ cents per 100 lb., on portland and hydraulic cement, carloads, min. wt. 38,000 lb. from Chanute, Ft. Scott, Humboldt, Iola, Mildred, Kan., and Dewey Okla., to stations on the Northeast Oklahoma (Miama, Okla., and all intermediate points on the N. E. O.). Remarks: The Northeast Oklahoma is building an extension of its line from Picher, Okla., to Columbus, Kan., and it is desired to have rates in effect when this new extension is completed, which will be about March 15.

7843. Chatts. To establish the Joplin, Mo., basis of rate on chatts carloads, min. wt. marked capacity of car, but not less than 60,000 lb. from stations on the Northeastern Oklahoma to points in Missouri and Kansas on the M. K. & T. Trt. 3015G, I. C. C. A5018 except to stations Quaker Spur, Kan. (Index 144) to Joplin (Index 150), inclusive, to which points it is proposed to carry the Columbus, Kan., rate of 5 cents per 100 lb. Rates to apply via Columbus, Kan., and M. K. & T. Remarks: The Northeast Oklahoma is constructing an extension of its line from Picher to Columbus, Kan., at which point it will connect with M. K. & T. Only rates at present in effect are through rates and it is claimed proposed rates are necessary in order for shippers on the N. E. O. to meet competition with shippers of chatts in the Joplin district.

7916. Sand and Gravel. To establish on sand and gravel, carloads, from Fullerton, La., to points on the T. & N. O. in Texas, on basis of the joint line good roads scale, as carried in Texas line Trf. 45C, which will result in the following rates to points shown:

	Rate
Blanchette	7
Rosedale	7
Gilbert	7
Voth	7
Ariola	7
Wiess	7
Nona	7.5
Kauntze	7.5

Note—The above rates to only apply when consigned to county, state or municipal officials for use in building good roads or streets and when the county or municipality pays the freight charges, i. e., where the benefit of this reduction accrues to the county, state or muncipality and not to the contractor. Remarks: Proposal is merely to take care of additional points to which it is stated there is a prospective movement.

Cement Plant in Yangste Valley

THE greatest demand for cement in China occurs in Shanghai, with Nanking in second place, says Consul J. K. Davis, Nanking, in a report to the Department of Commerce. These two cities are connected both by river and railway. The transport of commodities produced in one to the markets in the other is both quick and cheap, and as the greatest market possibilities exist in the Yangtze valley, it is the logical field for cement production. There are no plants now working in this district, but the China Cement Mfg. Co., has almost completed its plant at Chuyung, a small village 34 kilometers from the city of Nanking, and expects to begin operation in the spring. The capital of the company is taels 500,000, equivalent approximately to $380,000 American currency. The works are being built at Tiger Hill which is approximately one mile from the Shanghai-Nanking railway at Lungtan. A spur slightly over one mile in length has been constructed between Tiger Hill and Lungtan. The daily output of the works is estimated at 400 bbl. of 375 lb. each.

Unless the demand for cement increases even more rapidly than it has during the past several years, the erection of the China Cement Mfg. Co.'s plant, the planned enlargement of the existent plants in other districts, and the completion of a new Shanghai plant which has been started, will tend to greatly reduce the amount of imports from foreign countries.

Questions and Answers

Edmund Shaw, Consulting Engineer, Chicago, Ill., Expert on Problems of Screening, Washing and Hydraulic Separation

THE TECHNICAL STAFF OF ROCK PRODUCTS

Edwin Brooker, Washington, D. C., Consulting Expert on Matters of Transportation and Freight Rates

Gordon Smith, First National Bank Bldg., Chicago, Ill., Expert on Crushing and Cement-Plant Problems

No. 37. **Unloading Sand Dredges**—I propose to equip a 16x70-ft. barge with a 6-in. sand pump, connected to a gasoline engine of proper size on one end of the barge to pump the sand through a 6-in. pipe line with gates in the line for loading the sand into bins on the barge. These bins are to have hopper bottoms with outlet on one side—one in each bin to discharge the sand into a sump set at the river bank, at the plant, in water deep enough to take the loaded barge alongside in low water. The openings in the hopper bottom at the side of the barge will have a trough leading to an opening in the sump. After the barge is loaded the pump will be stopped, the barge taken in tow by a small boat to the sump, the side chutes put in place, and the sand pump started again, but this time to pump water only into the hopper-bottom bins on top of the sand, in order to wash the sand out through the chutes into the sump. There it will be reclaimed by another unit which will pump it into a silo along the railroad track.

Tell me what you think of this type of plant; if it would be practical; could I handle material cheaply; what slope would the hopper bottoms have in order to wash the sand out of them into the sump? About what capacity in tons would such a plant handle in a 10-hr. day? The tow would be about one mile downstream and across the river taking only about 10 min. each way each trip? The barge bin is 55 ft. long, 16 ft. wide and 24 in. deep, of course, the hopper bottom comes off.—C. J. M.

A. The scheme is practical insofar as there is nothing about it that could not be made to work. A somewhat similar plan has been applied in Europe to unloading ore and coal barges, the contents of the barge being dumped into a sump from which it is recovered by a grab bucket. It would seem a better plan to make the hoppers in the barge discharge through holes in the center and have two pipes along the sides of the barge to wash the sand to these center outlets. The hoppers being above the water line, this could be done. There would be more space in the hoppers by having the floor slope to the center than by having only one slope to the side. Almost any slope would carry the sand if enough water were used, but the greater the slope the faster the sand would run out and the less the water to be pumped. Using a center discharge, a slope of 1 in. to the foot could be used without cutting down the capacity of the hopper too much. The center discharge outlets could be pieces of pipe fastened to the bottom with flanges and gaskets to prevent leakage and passing up through the deck into the hopper. They could be closed with long wooden plugs while the hoppers were being filled. This is a common method of arranging a tank so that the contents may be sluiced out. The daily capacity of such a plant cannot be figured from the data given, as the time required to fill the barge is not known. The time taken to unload the barge is principally determined by the time required to pump the water to wash out the sand. The hoppers would hold about 70 tons of sand, made with a slope of 1 in. to the foot from the sides to the center. If twice this quantity of water were needed to wash it out, 140 tons, or 33,600 gal. of water would have to be pumped. At a rate of 1000 g.p.m., this would require 33.6 min. Another way of discharging barges is to pump directly from the barge. This method has been successfully applied at an unloading plant in Chicago.—E. S.

No. 38. **Royalty on Leased Quarry Land.**—We have a client owning certain lands having a valuable area of limestone rock—a large cliff or ridge full exposed and above ground. We have been approached by a railway company for a working lease to quarrying this rock for railroad ballast. What is a fair and customary royalty to the land owner for the material quarried wholly at the expense of the lessee?—M. C. C.

A. In Rock Products of February 10, page 30, you will find an article by C. C. Griggs, chief of the Non-Metal Valuation Section Income Tax Unit, Department of the Treasury, Washington, entitled, "Your Income Tax." In this article limestone quarry valuation is quite comprehensively covered. Mr. Griggs mentions 3 cents a ton as typical, but he also relates an instance where the stone was worth from 25 to 50 cents a ton in place. I know of royalties varying from 2 to 10 cents a ton. A fair average would be 5 cents—N. C. R.

No. 39. **Use of Gypsum in Making Toys, Etc.**—We have been told that fancy goods, toys, etc., have been made from a mixture of very white plaster of paris, terra alba, paraffin, etc., the mixture to be warm before placed in the molds. The inside molds forming these products are made of elastic rubber. Can you give us some information on this subject?—A. T.

A. Without special research we are unable to give you this information. Send your inquiry to the U. S. Bureau of Standards. It is likely that the bureau has some information which might be of value. The use of gypsum for the manufacture of such goods is regarded by manufacturers as a proprietary secret, which is our reason for not having any information on the subject. In cases where expansion must be provided for, the use of gelatine molds is common. —V. G. M.

No. 40. **What Is "Silica Gel"?**—As it is claimed that this new material has unusual powers of absorption, we believe that it could be adapted to certain processes of our business. Will you tell us something about it?—B. O. B.

A. The *American Fertilizer* for November 5, 1921, describes silica gel as the invention of an American chemist. It is described as follows: "Physically, silica gel appears like an ordinary solid having a hardness of about 4.5 and an apparent density of about 0.7. But it is not an ordinary solid; it possesses a highly porous structure. The pores are ultramicroscopic in size, but are so numerous that the voids in activated material constitute about 40 to 45 per cent of the total volume; that is, the total capacity of the pores in a cubic centimeter of gel is more than 0.4 of a cubic centimeter. This highly porous structure is obtained by a special process of manufacture which results in a product of uniform character. It may be made in any desired quantity. This porous structure gives to silica gel the power of selective absorption to a high degre. For example, if air or other permanent gas containing a large or small amount of the vapor of any volatile liquid —such as sulphur dioxide, water, alcohol, benzol, etc.—comes in contact with gel at the ordinary atmosphere, the vapor is very quickly taken up or absorbed by the gel, while the permanent gas is not. Moreover, the pores are of such size that the absorbed material may be readily driven out and, if desired, recovered in pure condition or at any condition preferred. Having been freed of its absorbed material the gel is in condition to be used over again. Its highly porous character and its chemical and physical stability, which makes the material practically indestructible, are the properties which give to silica gel a wide field of usefulness in the industries. These uses may be grouped under four heads: absorption from the gas phase; absorption from the liquid phase; as a catalyst; as a carrier for catalytic materials.—N. R. C.

No. 41. **Pulverized Limestone as Soil Food.**—We desire to obtain information as to the advantage of using pulverized limestone as a soil food.—H. A. R.

A. We suggest that you write to the agricultural experiment stations of each of the states asking them to send you their bulletins on the use of pulverized limestone. You might also write to Secretary A. P. Sandles of the National Agricultural Limestone Association, 405 Hartman building, Columbus, Ohio; it has issued several booklets on the subject.—N. C. R.

Quarried from Life

By Liman Sandrock

Thomas Robert Barrows

"The dome of Thought, the palace of the Soul."
—Byron.

IN our national capital city there are just two lofty, shining domes that we can readily call to mind at the moment. A real, honest-to-goodness dome always thrills us, whether it rears itself toward high heaven, as does the Capitol, or it caps the structure of a friend. In truth, we sometimes feel that the Capitol dome does not always tower o'er the abode of Thought or the palace of the Soul—under the folks who are now more or less guiding the destinies of this glorious republic.

Among our friends, however, there are domes which fairly radiate thought and soul; that are as shining marks for all that rests within. This may be putting it crudely, even baldly, but you get what we mean?

Getting down to the dome of the little brass tack, there's Thomas Robert Barrows, the able editor of the *Bulletin* and brilliant, capable secretary of the National Sand and Gravel Association. Aside from seeing his industry organized 100 per cent and the *Bulletin* growing to 200 pages, his expressed ambition is to discover "a real good hair restorer. To date, this ambition remains unsatisfied."

We never could understand why a few of our hair-bereft friends mourned the loss of their "overburden"; why they were more or less sensitive about a 100 per cent open countenance; why, outside of the extra labor needed for the morning ablutions, the bald head is not good economy and much to be desired.

Now, let us talk about Mr. Barrows' other ambitions, his work, and a few things that have made up his past life. He is married, and his "other earthly home is near Asheville, N. C." Both he and Warren Gamaliel are trained newspaper men—with this difference: The President can seek quietude and respite in Florida, and even Congress can take time off preparatory to again girding its loins for the fray—but our friend Thomas Robert is on the job without surcease and at the service of his industry.

It was during the memorable Louisville convention of the sand and gravel producers, on January 10, 1921, that he was attracted to the industry and converted to clean sand and gravel. As the *Bulletin* states, he is "a concrete example of what conversion will do." Immediately prior to this date, Mr. Barrows was publicity man for various well-known individuals and organizations, during which time he traveled the country pretty much over.

Mr. Barrows has had a practical and hard-earned legislative experience and his name is not unknown in the South. And we are doing him but scant justice when we assert that he is making a name for the sand and gravel industry at the national capital.

He firmly believes in publicity; that publicity as practiced today is a fine art. We must agree with him. Without publicity

Thomas Robert Barrows
Secretary the National Sand and Gravel Association

our rock products industry would be a poor and sorry thing. Publicity in its broadest sense has made the industry what it is today, and will continue to build it until it has taken its rightful place among those other basic industries which have given the people proper knowledge of their purposes, their usefulness, and their possibilities.

Mr. Barrows is a modest gentleman. He does not court publicity for himself. But he is wise to the fact that he must at times appear in the limelight in his capacity as secretary of a national organization that must keep itself and its officials "on the front page" if it is to accomplish all the big things it has set itself out to do. And a national secretary is usually the spokesman and the doer for his organization.

His training as an editor and publisher is ably reflected in the fine magazine he is getting out for his association; every issue contains some individual indorsement of that work.

All of which leads us back to the thought that "the dome of Thought" is a mighty useful equipment for a national secretary. In proof that Mr. Barrows possesses such a dome, we ask you to gaze on "the accompanying illustration," as the descriptive articles always advise us to do. This is "Fig. 1," and photographer Brooks has boldly pictured the necessary details.

He Found His Case!

Dear Lyman Sandrock:

I observed quite a sensational "advertisement" on this page for February 10. Apparently you put forth great effort to find the owner of the eyeglass case left in the registration room during the Crushed Stone convention. I did not see your "ad" until several Virginia friends had a good laugh at my expense, questioning me how, where and under what circumstances the case was lost.

I regret that I failed to interview King Hennessey XXX, although I would have been glad to meet him, and I had a Virginia friend who would have been delighted to join me.

Apparently, sir, you labor under the impression that young Virginians do not wear glasses, sir. Well, the owner of the case is superintendent of one of the largest crushing operations in the sovereign state of Virginia, sir.

REGINALD CADWALLADER CARRUTHERS.

[It was once our proud privilege to reside in fair Virginia, Mr. Carruthers, sir, and we knew many F. F. V.'s who wore glasses—wore them gracefully and without astigmatic affliction, sir!—L. S.]

They Said It

E. J. KRAUSE, Columbia Quarries Co.; "It is up to each of us to take the UN off of UNcertainty. We must make certain that the spirit of progress and business activity possesses the people with whom we come in contact."

A RETIRED terra cotta maker turns his $4,000,000 business over to his 36 employes. Remember the old lady who, after a balloon trip, was glad to get back on terra cotta? It's proved a good landing-place for these 36, also.

PROFESSOR WITHROW asks: "If the ancient times or the crude levels to which some of mankind are reduced have been called the stone age, is not this, our age, much more the stone age?"

JUDSON C. KING: "The National Agstone Association has done more to take this industry out of the infant class than any other thing I can think of."

Editorial Comment

Why Pick on Cement?

The national legislature has recently ended its session, not to assemble again—thanks be!—for several months. Unfortunately for our law-befuddled business men, many of our state legislatures are still grinding out laws. And from baiting the railways, the favorite occupation of our state "solons"—as the newspapers are wont to call them—seems to have turned to regulating all business connected with construction, but more particularly, in the Middle West at least, to baiting the portland cement industry.

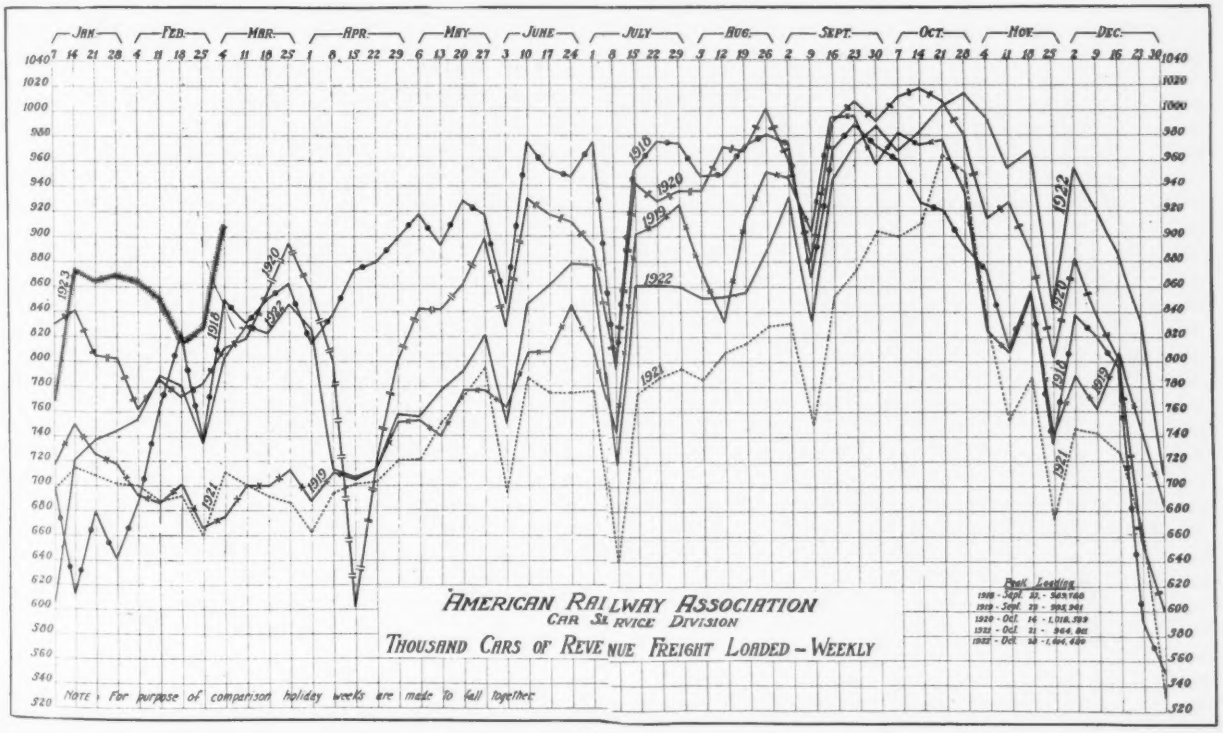
South Dakota already has a state portland cement plant under construction. Bills have been introduced or agitation has been started for state cement plants in Oklahoma, Kansas, Washington, Nebraska, Missouri, Illinois, Wisconsin, Texas and probably other states. In Montana a law to limit work in cement plants to six days a week is under consideration. Latest advices from Oklahoma say that the "solons" are switching from agitation for a state-owned plant to a law declaring cement production a public utility and having the state public utility commission fix the price!

Butter and eggs are a public utility in the same sense. It is doubtful if such a law would stand the test of the courts, but it serves to illustrate the curse that American business men suffer under as a result of sending cheap lawyers, professional politicians, labor agitators and ignorant farmers to make laws for the greatest and most complex industrial organization in all history.

It is high time for producers and manufacturers to take a more active interest in the management of their country as well as the management of their business enterprises. To do so means sacrifices of time, profit and personal comfort; but it is the essence of patriotism, and is as real a duty of a genuine American citizen as his function to bear arms in times of strife.

Car Supply for 1923

Look at the graph below and don't hesitate to join the "ship early in the season" campaign. The curves below, showing weekly car loadings of all revenue freight (excluding the railways' own coal and material movement) demonstrate clearly enough how the tendency to jam transportation increases as the season advances, reaching its climax in September and October. Except for the first two months 1922 shows the biggest and most uniform movement during the first half year of any year. This year, 1923, is starting out well. Keep it up so there won't have to be a big peak in the curve during the late summer months!



The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.25	1.10	1.10	1.10	.....
Buffalo, N. Y.			1.50 per net ton all sizes			
Chaumont, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Cobleskill, N. Y.	1.25	1.25	1.25	1.25	1.25	.....
Coldwater, N. Y.			1.50 per net ton all sizes			
Eastern Penna.	1.35	1.35	1.35	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.30	1.30	1.30
Prospect, N. Y.	.80	1.30	1.40	1.30	1.30	.....
Walford, Pa.	1.55	1.55	1.55	1.55	1.55	1.55
Watertown, N. Y.	1.00	.....	1.50	1.25	1.25	1.25
Western New York	.75	1.20	1.20	1.20	1.20	1.20
CENTRAL:						
Alton, Ill.	1.75	.....	1.50	1.35	.....	.....
Buffalo, Iowa	.70	.....	1.25	1.05	1.10	1.10
Chasco, Ill.	1.30	1.25	1.25	1.25	1.20	.....
Chicago, Ill.	1.30	1.70	1.30	1.30	1.30	1.30
Dundas, Ont.	1.00	1.35	1.35	1.25	1.10	1.10
Greencastle, Ind.	1.25	1.10	1.00	.90	.90	.90
Krause, Columbia and Valmeyer, Ill.	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30	1.30@1.50
Lannon, Wis.	.85	.....	1.05	.95	.95	.95
Mitchell, Ind.	.80	.80	.80	.80	.80	.80
Montreal, Canada	.80	1.35	1.05	.95	.90	.....
Montrose, Iowa	.....	1.50	1.60	1.55	1.45	1.40
Sheboygan, Wis.	1.10	1.10	1.10	1.10	.....	.....
Southern Illinois	1.35	1.35	1.35	1.25	1.25	.....
Stolle, Ill. (I. C. R. R.)	1.30	.....	1.35	1.35	1.35	1.35
Stone City, Iowa	.75	.....	1.50	1.40	1.35	.....
Toledo, Ohio	1.60	1.70	1.70	1.70	1.60	1.60
Toronto, Canada	1.90	2.25	2.25	2.25	2.00	2.00
			Prices include 90c freight			
Waukesha, Wis.	1.00	1.00	1.00	1.00	1.00	1.00
SOUTHERN:						
Alderson, W. Va.	.75	1.25	1.40	1.25	1.15	.....
Bridgeport, Texas	1.40	1.40	1.40	1.40	1.40	1.25
Bromide, Okla.	.75	2.00	1.75	1.60	1.50	1.25
Cartersville, Ga.	.....	1.75	1.75	1.25	1.25	.....
Chickamauga, Tenn.	1.00@1.10	1.00@1.10	.....	.90@1.10	.90@1.10	.....
El Paso, Texas	1.00	1.00	1.00	1.00	.....	.....
Ft. Springs, W. Va.	.80	1.20	1.40	1.35	1.25	.....
Garnet and Tulsa, Okla.	.50	1.60	1.60	1.45	1.45	.....
Ladds, Ga.	.....	.....	1.40	1.40	1.40	.....
Morris Spur (near Dallas), Tex.	1.25	1.25	1.40	1.40	1.40	1.25
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.80	1.80
Blue Spr'gs and Wymore, Neb.	.20	1.55	1.55	1.45	1.35	1.30
Cape Girardeau, Mo.	1.35	.....	1.10	1.35	1.10	.....
Kansas City, Mo.	1.00	1.50	1.50	1.50	1.50	1.50

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.50	1.30	1.10	1.00	.....
Bound Brook, N. J.	1.90	2.50	2.10	1.70	1.60	.....
Dresser Jct., Wis.	1.00	2.25	.....	1.75	2.00	.....
Duluth, Minn.	.90@1.00	2.25	1.75@2.00	1.35	1.35	1.35
E. Summit, N. J.	2.30	2.50	2.20	1.90	1.60	.....
Eastern Massachusetts	.60	1.85	1.40	1.40	1.40	1.40
Eastern New York	.75	1.50	1.30	1.30	1.40	1.40
Eastern Pennsylvania	1.25	1.70	1.60	1.50	1.40	1.40
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	.60	1.35@1.45	1.15@1.25	1.05	.95@1.00	.....
Oakland, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Richmond, Calif.	.50*	.....	1.50*	1.50*	1.50*	.....
Spring Valley, Calif.	.70	1.55	1.50	1.40	1.35	1.35
Springfield, N. J.	2.00	2.20	2.00	1.80	1.75	1.75
Westfield, Mass.	.60	1.35	1.25	1.10	1.00	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Buffalo, N. Y.—Granite	.90	.....	1.20	1.00	1.05	1.10
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	.....
Columbia, S. C.—Granite	.50	.....	2.00@2.50	2.00	.....	1.75@2.00
Dundas, Ont.—Limestone	1.00	1.35	1.35	1.25	1.10	1.10
Eastern Penna.—Sandstone	.85	1.55	1.55	1.40	1.35	1.30
Eastern Penna.—Quartzite	1.20	1.30	1.20	1.20	1.20	1.20
Lithonia, Ga.—Granite	1.00	.....	1.50	1.25	1.00	1.00
Lohrville, Wis.—Cr. Granite	1.35	1.40	1.30	.....	1.20	.....
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@1.75
San Diego, Calif.	.50@ .70	1.45@1.75	1.40@1.70	1.30@1.60	1.25@1.55	1.25@1.55
Sioux Falls, S. D.—Granite	1.00	1.60	1.55	.....	1.50	.....

*Cubic yard. †Agrl. lime. ‖R.R. ballast. §Flux. ‡Rip-rap, a 3-inch and less.

Agricultural Limestone (Pulverized)

Chaumont, N. Y.—Analysis, 95% $CaCO_3$, 1.14% $MgCO_3$—Thru 100 mesh; sacks, 4.00; bulk	2.50
Grove City, Pa.—Analysis, 94.89% $CaCO_3$, 1.50% $MgCO_3$; 60% thru 100 mesh; 45% thru 200 mesh; 100% thru 20 mesh; sacks, 5.00	3.50
Hillsville, Pa.—Analysis, 92% $CaCO_3$, 1.67% $MgCO_3$, 75% thru 100 mesh; 100% thru 50 mesh; sacks, 5.00; bulk	3.50
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
New Castle, Pa.—89% $CaCO_3$, 1.4% $MgCO_3$—75% thru 100 mesh, 84% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk	3.06
Walford, Pa.—Analysis, 50% thru 100 mesh; 4.50 in paper; bulk	3.00
Watertown, N. Y.—Analysis, 96% $CaCO_3$; .02% $MgCO_3$; 90% thru 100 mesh; bulk, 2.50; sacks	4.00
West Stockbridge, Mass., Danbury, Conn., North Pownal, Vt.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.25—cloth, 4.75; bulk	3.00
Alton, Ill.—Analysis, 97% $CaCO_3$, 0.1% $MgCO_3$; 90% thru 100 mesh	6.00
Belleville, Ont.—Analysis, 90.9% $CaCO_3$, 1.15% $MgCO_3$—45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk	2.50
Chasco, Ill.—Analysis, 96.12% $CaCO_3$, 2.5% $MgCO_3$; 90% thru 100 mesh.. 90% thru 50 mesh	5.00 1.35
Detroit, Mich.—Analysis, 88% $CaCO_3$, 7% $MgCO_3$—75% thru 200 mesh, 2.50@4.75—60% thru 100 mesh	1.80@3.80
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; sacks	4.50
Bulk	3.00
Piqua, Ohio—70% thru 100 mesh; bags, 5.00; bulk	3.50
90% thru 100 mesh; bags, 7.00; bulk	5.50
Yellow Springs, Ohio—Analysis, 96.08% $CaCO_3$, 63% $MgCO_3$; 32% thru 100 mesh; 95.57%, sacked, 6.00; bulk	4.25
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; 50% thru 100 mesh	1.50
Hot Springs, N. C.—50% thru 100 mesh; sacks, 4.25; bulk	2.70
Knoxville, Tenn.—80% thru 100 mesh	2.70
80% thru 200 mesh	3.50
(Bags 1.25 extra)	
Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; bulk	2.75
Mountville, Va.—Analysis, 76.60% $CaCO_3$, 22.83% $MgCO_3$—50% thru 100 mesh; 100% thru 20 mesh; sacks	5.00
Colton Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk	4.00
Lemon Cove, Calif.—Analysis, 94.8% $CaCO_3$, 0.42% $MgCO_3$; 60% thru 200 mesh; sacks, 5.25; bulk	4.50

Agricultural Limestone (Crushed)

Alton, Ill.—Analysis, 98% $CaCO_3$, 0.1% $MgCO_3$; 90% thru 50 mesh	1.50
Bellevue, Ohio—Analysis, 61.56% $CaCO_3$, 36.24% $MgCO_3$; ¼ in. to dust, about 20% thru 100 mesh	1.25
Bettendorf, Ia., and Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 50 mesh; 50% thru 4 mesh	1.50
Buffalo, Ia.—90% thru 4 mesh	1.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.3% $MgCO_3$; 50% thru 4 mesh	1.35
90% thru 4 mesh, cu. yd.	1.35
Chicago, Ill.—Analysis, 53.63% $CaCO_3$, 37.51% $MgCO_3$; 90% thru 4 mesh	.80
Columbia, Ill., near East St. Louis—½-in. down	1.25@1.80
Elmhurst, Ill.—Analysis, 35.73% $CaCO_3$, 20.69% $MgCO_3$—50% thru 50 mesh	1.25
Huntington and Bluffton, Ind.—Analysis 61.56% $CaCO_3$, 36.24% $MgCO_3$; about 20% thru 100 mesh	1.25

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Agricultural Limestone

(Continued from preceding page)

Greencastle, Ind.—Analysis, 98% $CaCO_3$—50% thru 50 mesh 2.00
Kansas City, Mo.—50% thru 100 mesh 1.50
Kraus and Columbia, Ill.—Analysis, 90% $CaCO_3$, 90% thru 4 mesh 1.20
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh 2.00
Screenings (¼ in. to dust) 1.00
Marblehead, O.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; screenings, 40% thru 100 mesh, 53% thru 50 mesh, 70% thru 50 mesh, 100% thru 10 mesh; sacks, 5.00; bulk ..... 1.25 / 3.50
Milltown, Ind.—Analysis 94.41% $CaCO_3$, 2.95% $MgCO_3$; 33.6% thru 100 mesh, 70% thru 50 mesh ..... 1.25@1.65
Mitchell, Ind.—Analysis, 97.65% $CaCO_3$, 1.76% $MgCO_3$, pulverized limestone 1.50
Montrose, Ia.—90% thru 100 mesh 1.25
Narlo, Ohio—Analysis 56% $CaCO_3$, 43% $MgCO_3$, limestone screenings, 37% thru 100 mesh; 55% thru 50 mesh; 100% thru 4 mesh ..... 1.50@2.00
Ohio (different points), 20% thru 100 mesh; bulk ..... 1.25@1.50
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk ..... .80@1.40
Stolle, Ill., near East St. Louis on I. C. R. R.—Thru ¼-in. mesh 1.30
Stone City, Ia.—Analysis, 98% $CaCO_3$ 50% thru 50 mesh ..... .75
Toledo, Ohio—¼-in. to dust, 20% thru 100 mesh 1.00
Waukesha, Wis.—No. 1 kiln dried 2.00
No. 2 Natural 1.75
Alderson, W. Virginia—Analysis 90% $CaCO_3$; 90% thru 50 mesh 1.75
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$ 2.00
90% thru 4 mesh 1.50
Cartersville, Ga.—Analysis 54% $CaCO_3$, 44% $MgCO_3$—all passing 10 mesh 1.75
Claremont, Va.—Analysis, 92% $CaCO_3$, 2% $MgCO_3$; 90% thru 50 mesh 3.00
50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh 2.75
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$—90% thru 50 mesh 1.50
Ladds, Ga.—50% thru 50 mesh 2.00
Garnett, Okla.—Analysis, 80% $CaCO_3$, 3% $MgCO_3$; 50% thru 50 mesh ..... .50
Kansas City, Mo., Corrigan Sid'g—50% thru 100 mesh; bulk 1.80
Tulsa, Okla.—90% thru 4 mesh 50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

GLASS SAND:

Berkeley Springs, W. Va. ..... 2.00@2.25
Cedarville and South Vineland, N. J.—Damp, 1.75; dry 2.25
Cheshire, Mass. (damp) 2.50
Columbus, Ohio ..... 1.50@ 2.00
Dunbar, Pa. (damp) 2.50
Falls Creek, Pa. 2.25
Hancock, Md.—Damp, 1.50; dry 2.00
Klondike and Pacific, Mo. 2.50
Mapleton, Pa. ..... 2.25@ 2.50
Mapleton Depot, Pa.—Damp, 2.00; dry 2.75
Massillon, Ohio 3.50
Michigan City, Ind. ..... .50@ .55
Mineral Ridge, Ohio 2.75
Montoursville, Pa. 2.00
Oregon, Ill. 2.50
Ottawa, Ill. 2.50
Pittsburgh, Pa.—Dry, 4.00; damp 3.00
Rockwood, Mich. ..... 2.50@ 3.00
Round Top, Md. 2.25
Sands, Pa. 2.50
San Francisco, Cal. ..... 3.00@ 3.50
St. Mary's, Pa. 3.00
Thayers, Pa. 2.50
Utica, Ill. ..... 1.50@ 1.75
Zanesville, Ohio ..... 2.00@ 2.50

FOUNDRY SAND:

Albany, N. Y.—Core ..... 1.25@1.75
Furnace lining ..... 2.25@2.75
Molding fine, coarse and brass molding (winter shipment) ..... 2.25@2.50
Sand blast (kiln dried) ..... 2.25@4.00
Allentown, Pa.—Core and molding fine ..... 1.50@1.75
Arenzville, Ill.—Molding fine ..... 1.50@1.75
Brass molding ..... 1.75@2.00
Beach City, O.—Core, washed and screened ..... 2.00@2.50
Furnace lining ..... 2.50@3.00
Molding fine and coarse ..... 2.25@2.50
Cheshire, Mass.—Furnace lining, molding, fine and coarse 5.00
Sand blast ..... 5.00@8.00
Stone sawing 6.00
Cleveland, O.—Molding coarse ..... 1.50@2.00
Brass molding ..... 1.50@2.00
Molding fine ..... 1.50@2.25
Core ..... 1.25@1.50

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Wholesale Prices of Sand and Gravel

Prices given are per ton, f.o.b., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge and So. Heights, Pa.	1.25	1.25	1.25	.85	.85	.85
Buffalo, N. Y.	1.10	.95	.85	.85	.85	.85
Erie, Pa.	.75		.90		1.15	
Farmingdale, N. J.	.48	.48	.75	1.10	1.10	
Hartford, Conn.	.90		1.25	1.15	1.15	1.15
Leeds Junction, Me.		.50	1.75	1.35	1.35	1.25
Machias, N. Y.	.75	.75	1.25	.85	.85	.85
Pittsburgh, Pa.	1.15	1.15	1.00	.70	.70	.70
Portland, Me.		.50	1.75		1.35	1.35
Washington, D. C. (Rewashed, river)	.75	.75	1.60	1.40	1.20	1.20
CENTRAL:						
Alton, Ill.		.85				
Anson, Wis.	.50	.40				.90
Barton, Wis.	.60	.60	.70	.70	.70	.70
Beloit, Wis.		.70			.80	
Chicago, Ill.		1.75@2.23	1.75@2.43			
Cincinnati, Ohio	.70	.65	.90	.90	.90	.90
Columbus, Ohio	.75@1.00	.75@1.00	.65@1.00	.75@1.00	.75@1.00	.75@1.00
Des Moines, Iowa	.50	.50	1.60	1.60	1.60	1.60
			Unwashed ballast, .50 ton			
Earlestead (Flint), Mich.	.70		60-40 sieves, .85; pebbles, .95			
Eau Claire, Wis.	.50	.45	1.25	.95		.90
Elkhart Lake, Wis.	.70	.70			.80	.80
Ft. Dodge, Iowa		1.22		2.17		
Grand Rapids, Mich.		.50		.80		.70
Hamilton, Ohio		.90			.90	
Hawarden, Iowa		.50			1.60	
Hersey, Mich.		.40			.70	
Indianapolis, Ind.	.60	.60		1.50	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.70	.60	1.75		1.70	1.60
Mankato, Minn. (pit run)	.40	.40	.50		1.25	
Milwaukee, Wis.		1.11	1.36	1.36	1.36	1.36
Minneapolis, Minn.	.35	.35	1.25@1.35	1.25@1.35	1.25	1.25
Moline, Ill.	1.00	1.00	1.60	1.60	1.60	1.60
Riton, Wis.		.40			.60	
St. Louis, Mo., f.o.b. cars	1.20	1.45	1.65	1.45		1.45
St. Louis, Mo., deliv. on job	2.05	2.20	2.35	2.15		2.10
Summit Grove, Clinton, Ind.	.65@ .75	.60@ .75	.60@ .75	.60@ .75	.60@ .75	.60@ .75
Terre Haute, Ind.		.60	.75	.75	.75	.75
Waukesha, Wis.	.50	.50	.80	.80	.80	.80
Winona, Minn.	.40	.40	1.25	1.25	1.15	1.15
			(.05 ton discount 10 days)			
SOUTHERN:						
Atlanta, Ga.	.75	.75		.90	.90	.90
Birmingham, Ala.	1.48		all gravel 1.88			
Charleston, W. Va.	all sand 1.40		all gravel 1.50			
Estill Springs, Tenn.	1.35	1.35		1.00	.85	.65
Ft. Worth, Texas	1.50@2.00	1.50@2.00	1.50@2.00	1.50@2.00	1.50@2.00	1.50@2.00
Jackson's Lake, Ala.	.50@ .60	.50@ .60	.40@1.00	1.00	.50@1.00	.50@1.00
Knoxville, Tenn.	.75@1.00	.75@1.00		1.00@1.50	1.00@1.50	1.00@1.50
Lake Weir, Fla.		.60				
Macon, Ga.		.50@ .75				
Memphis, Tenn.	1.00	1.00	1.80	1.80	1.80	1.80
N. Martinsville, W. Va.	1.00			1.20		.80
New Orleans, La.		.50			1.00	
Roseland, La.	.50		.85	.85		
WESTERN:						
Grand Rapids, Wyo.	.50	.50	.85	.85	.80	.80
Kansas City, Mo.			(Kaw river sand, car lots, .75 per ton; Missouri river, .85)			
Los Angeles, Calif.		.70	1.20	1.20	1.10	1.10
Pueblo, Colo.	1.10*	.90*		1.50*		
San Diego, Calif.	.50@ .70	.80@1.00	1.30@1.60	1.35@1.65	1.10@1.40	1.10@1.40
San Francisco, Calif.		1.00	1.00@1.20	.85@1.00	.85@1.00	.85@1.00
Seattle, Wash.	1.00*	1.00*	1.00*	1.00*		1.00*
Spring Valley, Calif.	.70	.80	1.40	1.35	1.25	1.25

Bank Run Sand and Gravel

City or shipping point	Fine sand, 1/10 in.	Sand, ¼ in.	Gravel, ½ in.	Gravel, 1 in.	Gravel, 1½ in.	Gravel, 2 in.
Atlanta, Ga.	.30@ .40	.30@ .40				
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Cape Girardeau, Mo.			River sand, 1.00 per yd.			
Cherokee, Iowa			.80 per ton—1.20 washed			
Dudley, Ky. (crushed sand)	1.00	1.00		.90		
East Hartford, Conn.			.65 per cu. yd.			
Elkhart Lake, Wis.	.70	.50			.60	.60
Estill Springs, Tenn.						.85
Fishers, N. Y.		.50@ .65		.50@ .65		
Grand Rapids, Mich.						.50
Hamilton, Ohio			.55 pe. cu. yd. in pit			
Hartford, Conn.		1.00*				
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Lindsay, Texas				.55	.55	
Janesville, Wis.		.65			.65@ .75	
Montezuma, Ind.			Road gravel .50 per ton			
Pine Bluff, Ark.			Road gravel .50			
Rochester, N. Y.	.60@ .75	.60@ .75			.50@ .65	.50@ .65
Roseland, La.		.75				
Saginaw, Mich., f.o.b. cars		.75	1.30	1.30	1.30	1.30
St. Louis, Mo.			60% gravel, 40% sand, 1.55			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waco, Texas		.80		1.50		1.30
Winona, Minn.			Clean pit run .60			
York, Pa.		.95@1.20	(Crushed rock sand)			

* Cubic yard. B Bank. L Lake. ‖ Ballast.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	4.00	1.00	2.50	1.35	1.25	1.15	1.15
Eastern Pennsylvania and Northern New Jersey	2.00	1.20	1.50	1.20	1.20	1.20	1.20
Easton, Pa.	2.50	.80	1.25	.90	.85	.80	.80
Erie, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Emporium, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Sharpsville and West Middlesex, Pa.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
Western Pennsylvania	2.00	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Chicago, Ill.	All sizes, 1.50, F.O.B. Chicago						
Detroit, Mich.	All sizes, 1.65, F.O.B. Detroit						
Ironton, O.	2.05	1.45	1.80	1.45	1.45	1.45	1.45
Steubenville, O.	2.00	1.40	1.70	1.40	1.40	1.40	1.40
Toledo, O.	1.75	1.50	1.50	1.50	1.50	1.50	1.50
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
Steubenville, Lowellville and Canton, O.	2.00	1.35	1.60	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.		1.55		1.55	1.55	1.55	1.55
Birmingham, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Ensley, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Longdale, Goshen, Glen Wilton & Low Moor, Roanoke, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing Hydrate	Masons' Hydrate	Agricultural Hydrate	Chemical Hydrate	Ground Burnt Lime Blk.	Ground Burnt Lime Bags	Lump Lime Blk.	Lump Lime Bbl.
EASTERN								
Adams, Mass.			7.00				2.90	
Bellefonte, Pa.		10.50§	10.50§	10.50§	9.00		8.50	1.80
Buffalo, N. Y.		12.00		12.00				
Berkley, R. I.			12.00					2.30
Cassadaga, N. Y.	Agricultural marl 7.00@10.00							
Chaumont, N. Y.					2.50	4.00		
Lime Ridge, Pa.							5.00	
West Rutland, Vt.	13.50	12.00					11.00	3.20
West Stockbridge, Mass.								2.25
Williamsport, Pa.			10.00			10.00	6.00	
York, Pa. (dealers' prices)		10.50	10.50					1.65*
Zylonite, Mass.	3.20d	2.90d	7.00					
CENTRAL:								
Cold Springs, Ohio		10.00	10.00				9.00	
Delaware, Ohio	11.50	10.00	9.50				9.00	1.60
Gibsonburg, Ohio	11.50		10.00		8.00	10.00	9.00	
Huntington, Ind.		10.00					9.00	
Luckey, Ohio	11.50		10.00					
Marblehead, Ohio		10.00					9.00	1.60
Marion, Ohio		10.00	10.00				9.00	
Mitchell, Ind.				12.00	11.00		10.00	1.60
Sheboygan, Wis.								7.50d
White Rock, Ohio	11.50				8.00	10.00		
Woodville, O. (dlrs.' price)	11.50a	10.00a	10.00a	11.00a			9.00	1.60
SOUTHERN:								
Erin, Tenn.							8.50	1.50
El Paso, Tex.							7.00	1.50
Karo, Va.							7.00	1.30
Knoxville, Tenn.	13.00	11.00@12.00		11.00@12.00	10.00	11.00	8.50	1.50
Ocala and Zuber, Fla.	13.00		12.00				12.00	1.60
Sherwood, Tenn.	12.50	11.00	11.00	11.00			8.50	1.50
Staunton, Va.					4.50	5.50	8.50	1.35
WESTERN:								
Colton, Calif.			15.00				19.70	
Kirtland, N. M.							15.00	
San Francisco, Calif.	21.00	21.00	15.00	21.00			15.00	2.15*
Tehachapi, Calif.							13.00	2.00

‡100-lb. sacks; *180-lb. net, price per barrel; †180-lb. net, non-returnable metal barrel; §Paper sacks. (a) 50-lb. paper bags; terms, 30 days net; 25c per ton or 5c per bbl. discount for cash in 10 days from date of invoice. (b) Burlap bags. (c) 200-lb. bbl. (d) 280-lb. bbl. net.

Miscellaneous Sands

(Continued from preceding page)

Delaware, N. J.—Molding fine	2.00
Molding coarse	1.90
Brass molding	2.15
Dunbar, Pa.—Traction, damp	2.50
Dundee, O.—Glass, core, sand blast, traction	2.50
Molding fine, brass molding (plus 75c for winter loading)	2.00
Molding coarse (plus 75c for winter loading)	1.75
Eau Claire, Wis.—Core	1.00@1.25
Sand blast	3.25@3.75
Falls Creek, Pa.—Molding, fine and coarse	1.75
Sand blast	2.00
Traction	1.75
Franklin, Pa.—Core	1.25@1.75
Furnace lining	2.50
Molding fine	2.00
Molding coarse	1.75
Brass molding	2.00
Greenville, Ill.—Molding coarse	1.50@1.75
Joliet, Ill.—No. 2 molding sand and loam for luting purposes; milled	.80
Bank run	.65
Kansas City, Mo.—Missouri River core	.80
Kasota, Minn.—Stone sawing	1.30@1.50
Klondike, Pacific, Gray Summit, Mo.—Molding fine and coarse	2.00
Molding fine	2.00
Mapleton, Pa.—Glass, core, furnace lining, molding fine and coarse; damp 2.00, dry	2.75
Massillon, O.—Molding fine and coarse, furnace lining, core, traction	3.00
Michigan City, Ind.—Core, traction	.40@ .45
Mineral Ridge, Ohio—Core, brass molding (green)	2.00
Furnace lining, molding fine and coarse; roofing sand, sand blast, stone sawing (green)	1.75
Traction (green)	1.85
Sand blast (dry)	2.75
Montoursville, Pa.—Core	1.25@1.75
Traction	1.75
Brass molding	1.40
New Lexington, O.—Molding fine	2.00
Molding coarse	1.75
(.75 extra per ton for winter loading)	
Oregon, Ill.—Core	1.50@2.00
Sand blast	4.00
Stone sawing	2.00@2.50
Ottawa, Ill.—Core, molding, steel, traction, roofing sand	2.00
Brass molding	3.00
Sand blast	4.00
Stone sawing	3.50
Furnace lining, molding coarse (crude)	.85@1.00
Ottawa, Minn.—All crude silica sand	.75@1.00
Rockwood, Mich.—Core	1.90
Roofing	3.00
Sand blast	3.75
Round Top, Md.—Core, furnace lining	1.45
Traction	1.60

(All per 2000 lb.)

Miscellaneous Sands

(Continued)

Columbus, Ohio—Core	.50@1.50
Sand blast	3.50@5.00
Molding fine	2.75@3.00
Molding coarse	2.50@3.00
Brass molding	2.50@3.00
San Francisco, Cal. (Washed and dried)—Core, molding fine, roofing sand and brass molding	3.50@3.50
Direct from pit.	
Furnace lining, molding coarse, sand blast	3.60
Stone sawing, traction	2.30
Thayers, Pa.—Core and traction	2.00
Furnace lining	1.25
Molding fine and coarse	1.25
Utica, Ill.—Core	.85@1.00
Furnace lining (crude and dry)	1.00@1.75
Molding fine and coarse (crude and dry	.85@1.75
Roofing sand	1.75
Sand blast	2.50@3.50
Stone sawing	2.50
Traction	1.50@1.75
Brass molding (crude and dry)	1.00@1.75
Utica, Pa.—Core	1.25@2.25
Molding fine and coarse, traction, brass molding	2.00
Warwick, Ohio—Molding coarse and core—dry	3.00
Green	2.00
Furnace lining and molding fine—dry	2.75
Wet	2.00
Traction and brass molding fine—dry	2.75
Zanesville, Ohio—Core	2.25
Furnace lining	2.00
Molding fine	1.75@2.00
Molding coarse	1.50@1.75
Steel molding	1.75@2.00

Talc

Prices given are per ton f. o. b. (in carload lots only) producing plant, or nearest shipping point.

Baltimore, Md.—Crude talc (mine run)	3.00
Ground talc (20-50 mesh), bags	10.00
Ground talc (150-200 mesh), bags	12.00
Cubes	50.00
Blanks (per lb.)	.07
Chatsworth, Ga.—Grinding	6.00
Ground talc (150-200 mesh); bags	12.00
Pencils and steel workers' crayons (gross)	1.50@ 2.50
Chester, Vt.—Crude talc	4.50
Ground talc (150-200 mesh), bulk	5.50@ 8.50
Emeryville, N. Y.—200-325 mesh; (double air floated), bags	14.75
Glendale, Calif.—Ground talc (150-200-mesh)	16.00@30.00
(Bags extra)	
Ground talc (50-300 mesh)	13.50@15.50
200 mesh	13.50@14.50
Hailesboro, N. Y.—Ground talc (150-250 mesh), bags	18.00
Henry, Va.—Crude talc (lump mine run) per 2000-lb. ton	2.75@ 3.50
Ground talc (20-50 mesh), bags	8.75@10.00
(150-200 mesh), bags	9.75@12.50
Los Angeles, Calif.—Ground talc (200 mesh) (includ. bags)	16.00@20.00
Mertztown, Pa.—Ground talc (20-50 mesh); bulk, 5.00; bags	6.00
(150-200 mesh); bulk, 7.00; bags	8.00
Natural Bridge, N. Y.—Ground talc (150-200 mesh) bags	12.00@13.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk	8.50@10.00
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@22.00
(Bags extra)	
Vermont—Ground talc (20-50 mesh); bags	7.50@10.00
Ground talc (150-200 mesh); bags	8.50@15.00
Waterbury, Vt. — Ground talc (20-50 mesh), bulk	5.00
(Bags 1.00 extra)	
Ground talc (150-200 mesh), bulk	8.00@14.00
(Bags 1.00 extra)	
Pencils and steel workers' crayons, per gross	1.20@ 2.00

Rock Phosphate

Raw Rock

Per 2240-lb. Ton

Centerville, Tenn.—B.P.L. 65%	6.00@8.50
B.P.L. 65%	6.00
Gordonsburg, Tenn.—B.P.L. 68%-72%	4.25@5.00
Tennessee—F. o. b. mines, long tons, unground Tenn. brown rock, 72% B. P. L.	7.00
Mt. Pleasant, Tenn.—Analysis, .65-.70% B.P.L. (2000 lb.)	6.50
Paris, Idaho.—2000 lb. mine run, B.P.L. 70%	3.25@3.50

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Gray Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$10.20	$8.40	$8.10	$7.50
24x14	10.20	8.40	8.10	7.50
22x12	10.80	8.70	8.40	7.80
22x11	10.80	8.70	8.40	7.80
20x12	12.60	9.00	8.70	8.10
20x10	12.60	9.00	8.70	8.10
18x10	12.60	9.00	8.70	8.10
18x 9	12.60	9.00	8.70	8.10
16x10	12.60	8.70	8.40	7.80
16x 9	12.60	8.70	8.40	7.80
16x 8	12.60	8.70	8.40	7.80
18x12	12.60	9.00	8.70	8.10
16x12	12.60	8.70	8.40	7.80
14x10	11.10	8.40	8.10	7.50
14x 8	11.10	8.40	8.10	7.50
14x 7 to 12x6	9.30	8.10	7.50	7.50
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Ground Rock

Wales, Tenn.—B.P.L. 70%	7.75
Per 2000-lb. Ton	
Barton, Fla. — Analysis, 50% to 65% B.P.L.	3.50@8.00
Centerville, Tenn.—B.P.L., 60-65%	6.50
B.P.L. 75% (brown rock)	12.00
Columbia, Tenn.—B.P.L. 68% to 72%	5.50
B.P.L. 65% (90% thru 200 mesh) bulk	5.50
Montpelier, Idaho — Analysis, 72% B.P.L., crushed and dried	3.75
Mt. Pleasant, Tenn.—B.P.L. 65%	5.50
Twomey, Tenn.—B.P.L. 65%	6.50

Florida Soft Phosphate

Raw Land Pebble

Per Ton	
Florida—F. o. b. mines, long ton, 68/66% B.P.L.	3.00
68% (min.)	3.25
70% (min.)	3.50
Jacksonville (Fla.) District	10.00@12.00

Ground Land Pebble

Per Ton	
Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Morristown, Fla.—26% phos. acid	16.00
Mt. Pleasant, Tenn.—65-70% B.P.L.	5.00@ 6.00

Fluorspar

Fluorspar — 80% and over calcium fluoride, not over 5% silica; per ton f. o. b. Illinois and Kentucky mines	20.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f. o. b. Illinois and Kentucky mines	21.50

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Chicago, Ill.—Stucco chips, in sacks f.o.b quarries		17.50
Deerfield, Md. — Green; bulk	7.00	7.00
Easton, Pa.—Evergreen, creme green and royal green marble	10.00@16.00	16.00@18.00
Slate granules		8.00@ 9.00
Granville, N. Y. — Red slate granules		7.50
Harrisonburg, Va.—Blk. marble (crushed, in bags)		12.50
Ingomar, Ohio (in bags)		10.00@25.00
Milwaukee, Wis.		16.00@30.00
New York, N. Y.—Red and yellow Verona		32.00
Middlebrook, Mo.—Red		25.00@30.00
Phillipsb'g, N. J.—Green stucco dash	20.00@22.00	16.00@20.00
Poultney, Vt.—Slate granules		7.50
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Tuckahoe, N. Y.		12.00@20.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b., bags 12½c extra	4.50	4.50

Concrete Brick

Prices given per 1,000 brick, f. o. b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	20.00	25.00@35.00
Birmingham, Ala.	13.30	21.75
Carpenterville, N. J.	16.00	31.50@40.00
Easton, Pa.	16.00	40.00@60.00
Eugene, Ore.	25.00@26.00	50.00@75.00
Friesland, Wis.	23.00@24.00	30.00@35.00
Houston, Tex.		19.50
Omaha, Neb.	16.00	30.00@40.00
Portland, Ore. (Del'd)	21.00	45.00@60.00
Puyallup, Wash.	20.00	40.00@75.00
Rapid City, S. D.	18.00	25.00@45.00
St. Paul, Minn.	15.00	30.00@37.00
Salem, Ore.	25.00	35.00@50.00
Salt Lake City, Utah	17.00@18.00	35.00@40.00
Springfield, Ill.	18.00	20.00@25.00
Wauwatosa, Wis.	13.00@14.00	28.00@75.00
Watertown, N. Y.	18.00@20.00	32.00@35.00
Winnipeg, Can.	18.00	26.00

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	11.00
Boston, Mass.	15.00@16.50
Buffalo, N. Y.	16.50
Dayton, Ohio	12.50@13.50
El Paso, Texas	13.00
Grand Rapids, Mich.	12.25
Lancaster, N. Y.	14.00
Michigan City, Ind.	11.00
Milwaukee, Wis. (delivered)	14.00
Minneapolis, Minn.	13.00
Plant City, Fla.	10.00
Redfield, Mass.	15.00
Rives Junction, Mich.	11.00
Saginaw, Mich.	12.00
San Antonio, Texas—Common	15.00
South Dayton, Ohio	12.50@13.50
Syracuse, N. Y. (delivered at job)	18.00
f.o.b. cars	14.00
Washington, D. C.	14.50

Lime

Warehouse prices, carload lots at principal cities.

	Hydrate per Ton	
	Finishing	Common
Atlanta, Ga.	23.00	20.00
Baltimore, Md.	22.00	16.25
Cincinnati, Ohio	15.80	13.30
Chicago, Ill.	18.00	18.00
Dallas, Tex.	22.50	.....
Denver, Colo.	24.00	.....
Detroit, Mich.	19.50	17.50
Kansas City, Mo.	25.60	24.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.	21.00	21.00
New Orleans, La.	.....	17.25
New York, N. Y.	16.80	13.10
Philadelphia, Pa.	15.50	14.50
St. Louis, Mo.	21.40	19.20
San Francisco, Calif.	22.00	16.00
Seattle, Wash. (paper sacks)	24.00	.....
	Lump per 180-lb. Barrel (net)	
	Finishing	Common
Atlanta, Ga.	2.25†	1.85†
Cincinnati, Ohio	.....	10.75‡
Chicago, Ill.	1.50†	1.40†
Dallas, Tex.	.....	2.50†
Denver, Colo.	.....	2.70†
Detroit, Mich.	.....	18.25‡
Kansas City, Mo.	2.40†	2.40†
Minneapolis, Minn.	1.55†	1.40†
Montreal	15.00‡	11.00‡
New Orleans, La.	2.40†	.....
New York, N. Y.	3.75*	3.00@3.25*
Philadelphia, Pa.	13.00‡	12.00‡
St. Louis, Mo.	17.75	17.75‡
San Francisco, Calif.	.....	1.75†
Seattle, Wash.	2.80†	.....

*Per 280 lb. bbl. (net). †Per 180-lb. bbl. (net). ‡Per ton. Refund of 10c per bbl. Minneapolis quotes brown common lump lime: Kelly Island white is $1.55, Sheboygan $1.45. New York quotes hydrated lime "on cars" in paper sacks; lump lime "alongside dealers' docks" or "on cars."

Portland Cement

Current prices per barrel in carload lots, f. o. b. cars, without bags.

Atlanta, Ga.	2.80
Boston, Mass.	2.68
Cedar Rapids, Iowa	2.48
Cincinnati, Ohio	2.54
Cleveland, Ohio	2.46
Chicago, Ill.	2.20
Dallas, Tex.	2.25
Davenport, Iowa	2.43
Denver, Colo.	2.65
Detroit, Mich.	2.47
Duluth, Minn.	2.14
Indianapolis, Ind.	2.41
Kansas City, Mo.	2.45
Los Angeles, Calif.	2.56
Milwaukee, Wis.	2.37
Minneapolis, Minn.	2.39
Montreal, Can. (sacks 20c extra)	2.40
New Orleans, La.	2.83
New York, N. Y.	2.30
Phoenix, Ariz.	3.70
Pittsburgh, Pa.	2.24
Portland, Ore.	3.05
San Francisco, Calif.	**3.03@3.55
St. Louis, Mo.	2.35
St. Paul, Minn.	2.39
Seattle, Wash.	2.90
Toledo, Ohio	2.48

NOTE—Add 40c per bbl. for bags.
** + warehouse.

Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco* Calcined Gypsum	Cement‡ and Gauging Plaster	Wood Fiber	White§ Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ⅜x32x36" Weight 1500 lb. Per M Sq. Ft.	⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Douglas, Ariz.	.....	6.00	6.00	.....	13.00	.....	.....	.....	.....	.....	.....	.....	.....
Fort Dodge, Iowa	3.00	3.50	6.00	8.00	10.00	10.50	20.00	.....	21.30	20.00	20.00	.....	30.00
Garbutt, N. Y.	.....	.....	6.00	8.00	10.00	10.00	.....	7.00	.....	.....	.....	20.00	.....
Grand Rapids, Mich.	3.00	.....	5.00	10.00	10.00	10.00	.....	.....	31.00	.....	19.75	20.00	30.00
Hanover, Mont.	4.50	.....	6.00	10.00	.....	10.50	.....	.....	.....	.....	.....	.....	.....
Mound House, Nev.	.....	8.50	6.50	10.50@11.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oakfield, N. Y.	3.00	4.00	6.00	8.00	10.00	10.00	20.20	7.00+	30.75	21.00	19.375	20.00	30.00
Rapid City, S. D.	4.00	.....	.....	10.00	11.00	11.50	.....	.....	33.75	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	.....	16.40	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	.....	.....	.....	.....	28.50	.....	35.00

NOTE—Returnable Jute Bags, 15c each, $3.00 per ton; Paper Bags, $1.00 per ton extra.
*Shipment in bulk 25c per ton less; ‡Bond plaster $1.50 per ton additional; +Sanded Wood Fiber $2.50 per ton additional; §White Moulding 50c per ton additional; ||Bulk; (a) Includes sacks.

Kelley Island's New Bond Issue of $2,000,000

A $2,000,000 BOND ISSUE, dated April 1, 1923, to mature April 1, 1933, of 6 per cent 10-year sinking fund debentures of the Kelley Island Lime and Transport Co., has been announced by the Union Trust Co., trustee, of Cleveland.

In their summarization of the business, John A. Kling, chairman of the board, and George R. Johnson, president of the company, state that the company, organized in 1886, is the largest producer of crushed stone in the world, with properties located in Marblehead, White Rock, Kelley Island, Sandusky, Tiffin, Gibsonburg, and Marion, Ohio; Buffalo and Dover Plains, N. Y.; Rockport, Mich., and Huntington, Ind.

The company's products consist of limestone for flux and for agricultural purposes; and lime products for building and a wide variety of manufacturing uses. Its customers include practically all of the large steel companies, blast furnaces, chemical companies and dealers in building materials in the United States.

In the statement of issue of January 1, 1923, the total assets are shown to be $11,470,474, and a net worth of $10,810,272 after deducting all liabilities. The proceeds of this issue will be used for repaying bank indebtedness, largely incurred in acquiring new property, and in additional construction.

The directors are given as follows: F. A. Beckwith, H. G. Dalton, A. Y. Gowen, H. M. Hanna, Jr., John Sherwin, W. G. Mather, C. R. Morley, John E. Morley, E. W. Oglebay, Hon. W. B. Sanders, John A. Kling George R. Johnson, and G. J. Whelan.

Suspend Increased Rates on Lime

A LETTER from the I. C. C. to A. L. Hays, secretary of the Bristol (Tenn.) Chamber of Commerce advises that the increased freight rates on lime from Knoxville to Bristol will be suspended until July 2. It was also stated that a hearing would be held in Washington on March 16 to investigate the increased rates.

Mr. Hays' statement follows: "The fact that the Southern Railways has increased the freight rates on lime from Knoxville to Bristol is important to manufacturing interests here. The Columbia Paper Co. and the Dixie Tannery alone use 25 carloads of lime each week and other building supply companies use large quantities. This will also increase the cost of building houses as all the lime used in Bristol comes from Knoxville.

"The Chamber of Commerce filed a complaint with the Interstate Commerce Commission asking it to suspend the increased rates until a hearing on the question could be held.

"It seems that the Southern Railway has picked Bristol and Johnson City out as the increased freight rates on lime also applies to the latter city. It has not increased freight rates on lime to other points using large quantities of lime and apparently cares little about the manufacturing interests here. The Chamber of Commerce will carefully watch the freight rate situation to prevent any further attempts on the part of the railway in its discrimination against Bristol on lime or any other product that has to be shipped in here."

Two Iowa Stone Products Association Officials

IN its issue for February 24, ROCK PRODUCTS made brief mention of the newly-formed Iowa Stone Products Association.

Paul M. Nauman

Here are a few facts concerning the president and the secretary-treasurer.

President Paul M. Nauman is the vice-president of the Eagle Point Lime Works, of Dubuque and, of course, bears the honor of being the first executive of what promises to be, in the language of the secretary-treasurer, R. N. Van Winkle, an organization "full of pep and ambition. I am positive that a great deal of good is going to come out of this association, as heretofore the Iowa stone business has been in a more or less chaotic condition and it was high time that something was done."

Secretary Van Winkle has had a wide and varied experience in the industry, as well as being a graduate civil engineer of Purdue University, in which profession he had supervision over a great deal of construction work embracing the products now being developed by the new association.

In an early issue ROCK PRODUCTS will feature Mr. Van Winkle on its "Quarried From Life" page, when his busy and eventful career will be gone into with more exacting detail.

No Cement Shortage Likely in 1923

THERE should be no portland cement shortage in 1923, barring unforeseen labor, fuel or transportation difficulties, says the *Wall Street Journal*. Despite occasional reports that imports may be necessary, large manufacturers are confident the country's capacity will considerably more than supply the great demand for construction and road building.

These men point to the fact that last year's shipments of 116,563,000 bbl., the largest on record, were approximately 30,000,000 bbl. below the country's mill capacity, which is estimated to be about 146,000,000 bbl.

At least seven new mills of substantial capacity will be brought into operation during the year besides a number of smaller

R. M. Van Winkle

units which should bring the output near to 150,000,000 bbl. Consensus does not place requirements for 1923 in excess of 125,000,000 bbl.

JOHN J. SLOAN, Wisconsin Granite Co.: "We certainly represent a wide extent of territory in supplying basic needs that enter into all human existence—from the lime water that was probably fed to you as an infant to the concrete casket with which you may pass away."

$2,500,000 Lime and Cement Plant to Be Constructed at San Jose

THE largest lime and cement plant in the United States will be constructed at San Jose, Calif., shortly, according to information obtained. The Guadalupe Lime and Cement Co., representing $250,000, all of which has been paid in, insuring ample funds with which to carry on the work, has secured 1000 acres on the Almaden road southwest of San Jose, upon which they will eventually construct $2,500,000 worth of buildings and equipment, with a capacity of 1800 tons of lime daily output.

Preliminary surveys and right of way construction have been going forward during the last 14 months. The work of erecting the plant proper is expected to be started within the next few weeks.

All internal transportation of the project, it is understood, will be handled by a compressed air system identical with that now in use in the two largest potash plants in the country. Among other features is to be a 2700-ft. tunnel passing through the property to connect with the branch line of the Southern Pacific near Almaden station.

The plant will employ about 600 men during the period of construction, which will begin within the next two or three weeks, and will require a permanent force of about 300 employes, making it one of the largest industries in this section.

Waco Lime Co.'s New Plant Under Way

PLANS have been completed for the erection of the plant to be built by the Waco Lime Products Co., Waco, Texas.

This company, formerly known as the Koury Calcium Co., McGregor, Texas, has been incorporated at $400,000. A hydrator and other equipment will be provided for a larger output in the near future. B. R. Litsinger, formerly of Baltimore, is president.

Signal Mountain Cement Co.'s First Unit Nearing Completion

THE first unit of the $3,000,000 plant of the Signal Mountain Portland Cement Co., now being erected at Glendale, Tenn., will be placed in operation in June, weather permitting, according to Col. Clarence Steward, vice-president, acting head of the institution. The working forces have been doubled and work is carried on 24 hr. a day.

The first unit of the 5000-bbl. plant will have a capacity of 1250 bbl. daily. Effort will be made to have the second unit in operation during July if conditions permit. Over $1,000,000 has already been expended on the plant, which, according to engineering reports, represents the last word in design in plants of this type.

The plant is more than 2000 ft. in length, is situated in the center of rich raw material deposits and is served by six railroads, as well as being located on the Tennessee river. Belief is held that in time to come Chattanooga-made cement will be shipped to the Mississippi river for distribution to all parts of the United States. The company already has plans for one of the most complete dock and river transport systems of any organization in this part of the South. The Nashville, Chattanooga & St. Louis railroad, for several months past, has had under consideration a plan for the establishment of a permanent barge line to serve this plant and other manufacturing establishments projected on the stream.

Rock Loading at Lime Quarries

REMOVING fragments of broken rock from the quarry floor and placing them in cars for transportation to the kilns is a very important lime-plant quarry process, states Oliver Bowles, mineral technologist, Bureau of Mines. At most lime plants rock-loading constitutes the largest single item of quarry cost. In view of the great expense involved in loading, a consideration of the relative merits of different methods followed, and the conditions under which each method may be most advantageously employed are worthy of more than ordinary attention. These matters are discussed in Serial 2446, which may be obtained from the Bureau of Mines, Washington, D. C.

Eastern Potash Corp. Declared Bankrupt

THE Eastern Potash Corp. and its subsidiary, the Raritan Refining Corp., have been adjudicated bankrupt by the Delaware courts. The trustee in bankruptcy will supersede the equity receivers.

For speedy reorganization and sufficient funds to complete the plant of the corporation as well as supply working capital, a committee has been formed consisting of C. W. Stapleton, W. D. Huntington and J. W. Reid, all of whom are large creditors.

The assets of both companies are substantial. A recent appraisal shows the plant of the Eastern Potash Corp. to be worth about $2,000,000; the Raritan plant is estimated at about $1,000,000.

The committee is convinced that the affairs of the corporation can be worked out with very little, if any, loss to any creditor provided the parties at interest act together.

Charles W. Stapleton is the general counsel for the Kelly Springfield Tire Co., Warner D. Huntington is vice-president of the Davison Chemical Co. and James W. Reid is connected with the Sinclair Consolidated Oil Co.

Looks for a Busy Year

"WE look for a busy year in our line," said Ed C. Wilson, recently appointed Western sales manager of the Ohio Locomotive Crane Co. of Bucyrus, Ohio, when paying ROCK PRODUCTS a friendly visit on March 22.

Mr. Wilson was formerly in the railway supply and equipment field. He is a graduate of Lehigh University in electrical engineering. Since then he practiced his calling with several of the large organizations promoting hydro-electric power developments in the East and South.

Mr. Wilson's offices are at 655 Railway Exchange building, Chicago.

Toronto's New $3,000,000 Cement Corporation

THE Toronto Cement Corp., Ltd., Toronto, has been organized with a capital of $3,000,000. A. J. Young is president, A. M. Harley, vice-president and secretary, C. A. Patterson, treasurer, and H. C. Shields, superintendent. Mr. Shields was formerly general superintendent of the Northampton Portland Cement Co., chief engineer construction, Atlantic Portland Cement Co., general manager Edison Portland Cement Co., general manager Marengo Portland Cement Co., consulting engineer American-Peerless and Egyptian Portland Cement Co., later general superintendent Wolverine Portland Cement Co. He has also been engaged in installing machinery for the Fuller Engineering Co. of Allentown.

The Toronto Cement Co. has taken over the plant of the Ontario Cement Co. at Beachville, Ont. The Dominion Appraisal Co. estimates that the limestone and clay deposits are worth $600,000. It is planned to establish a plant to manufacture 4500 bbl. per day.

Indiana Limestone Rates Drop

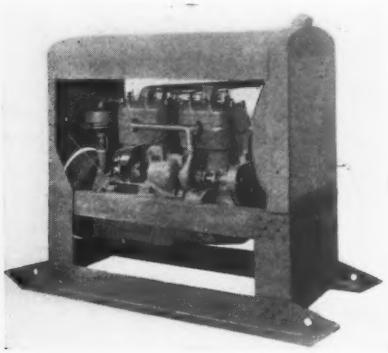
INDIANA intrastate freight rates on agricultural limestone will drop an average of about 25 per cent as soon as railroad companies can publish the new tariffs, John W. McCardle, chairman of the public service commission, announced on March 12. He said "an immense amount" of the soil medicine is transported in Indiana each year.

Mr. McCardle made the announcement at the end of a conference between Leo P. Day, an attorney for the New York Central railroad, and other railroad representatives, with O. P. Gothlin, the commission's freight rate expert. The new rates will come, Mr. McCardle said, as the result of an agreement proposed by the railroads to settle a case Mr. Gothlin was pressing against them on behalf of the Indiana State Farm, which manufactures much prepared limestone.

New Machinery and Equipment

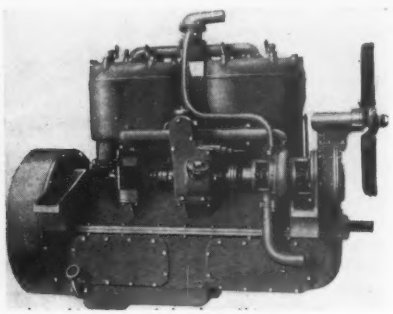
A New Power Unit

A NEW industrial power unit, arranged for either stationary or portable use, is now being offered to power users by the Climax Engineering Co., Clinton, Iowa. This unit is entirely self-contained and consists of a fully-equipped model KU, 5x6½ in., four-cylinder Climax



Industrial power unit for either stationary or portable use

"Trustworthy" engine, with radiator, air cleaner, muffler, starting crank, gasoline tank, complete hood and side panels, structural shell base on steel skids, multiple-disc clutch and flexible copling or pulley. A self-starter with generator and battery can also be furnished if desired.



Four-cylinder, 5½x7-in. engine engine

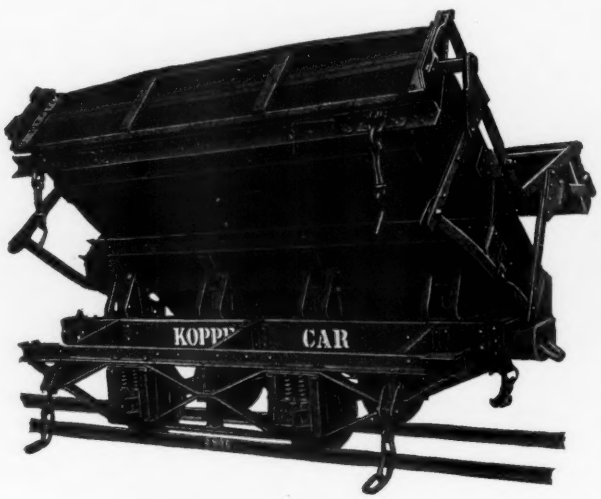
The field for such a complete power unit is said to be almost unlimited where the load does not exceed 50 hp., developed at the nominal engine speed of 1000 r.p.m. Reduction gear can be supplied on such installations as require lower speeds. These power units can be operated on either gasoline, kerosene or natural gas, although the maximum power output can only be secured on gasoline.

Many uses for this type of power unit will immediately suggest themselves to the producer and users of rock products, such as hoists and draglines, concrete mixers and loaders, air compressors, sand-cutting machines, hydraulic machinery, stone crushers, electric generators, road-building machinery of all types, and as an emergency power source for all purposes. This power unit can be used either indoors or outdoors.

This company also produces a 75-hp. unit of similar construction, using its model TU engine, and can also supply a 120-hp. unit with its new six-cylinder model R-6 engine.

Square Box Dump Cars

PRESENT-DAY quarry demands are for cars constructed to withstand steam-shovel strain and to work under severe conditions. To meet these demands for heavy, substantial equipment, the Koppel Industrial Car and Equipment Co., Koppel, Pa., has designed a square-box dump car known as the "hinged" type, the body of which is permanently hinged to the underframe. This car, says the company, is making good service records. It has substantial door construction; its large door opening enables the car to dispose of large boulders, eliminating the danger of such obstacles becoming wedged between the door and floor; pressed steel diaphragms in the underframe, and possesses flexibility, this car being equipped with double-spring suspended bearings.



Hinged type of square box dump car

The doors and ends are constructed of 1¼-in. oak stiffened and protected by steel angles; the door top angle is trussed at center, insuring a strong edge at top of door to withstand accidental steam-shovel blows. The door opening is large and the dumping angle steep, affording clear discharge of contents. The doors are operated by Koppel patented toggle arrangement.

The floor is of 2⅜-in. oak mounted on a rigid steel frame of center and side sills made of channel and rolled angles. Heavy T sections are riveted to these sills, forming a rigid unit to which the floor is bolted. The body has four cast-steel hinges riveted between the center sills, thus fastening the body to the frame of car.

The underframe is composed of center and side sills made of channel and rolled angles. These sills are mounted on heavy steel bolsters braced by arch bars. A feature of the Koppel car is the framework of pressed steel diaphragms between the center and side sills and bolsters.

Chilled iron wheels on 4-in. steel axles form the running gear. The journal boxes are semi-steel; the boxes, with lead-lined brass bearings, are suspended in two well-dimensioned helical springs, this arrangement insuring flexibility to the car when traveling over rough roadways. The cars are equipped with spring-draft gear.

Dust Arrestor of the Cloth Screen Type

THE accompanying illustration shows a cloth screen dust collector, so called because of the cloth-covered frames suspended from the top of the structure, one

in front of the other. They hang loose at the bottom and because of their tapering form, the dust is easily jarred loose, to fall down into the hopper.

The housing of the arrestor is constructed of sectional U-shaped steel plates which are absolutely air-tight, declares the makers, the MacLeod Co., Cincinnati, Ohio, because of the coat of composition applied to the joints before bolting together.

The inlet pipe on one of the sides of the dust arrestor is connected to piping leading to the source, where the dust is drawn out or collected. This dust-laden air passes into the arrestor and through the screens, which will filter all the dust from the air, which is then drawn through the exhaust fan on the suction side of the housing, free from dust and, therefore, causing no trouble to the fan blades. This air, in some cases, can be sent back into the room.

A rapping device is attached to the housing, extending through it and is attached to each screen. The outer part of this device is fitted with knockers, so that when set in operation they jar all the dust loose from the screens and it falls into the hopper at the bottom.

This screen arrestor is also adaptable for collecting coal dust, stone dust, cement, lime, slate, gypsum, etc. For these, however, the collector is constructed somewhat differently as these materials are much finer than ordinary dust. To handle them, the inlet end of the housing is fitted with a series of baffles, through which the dust passes down into the hopper, then the dust not taken care of passes through the screens.

Cloth screen dust collector. The frames are suspended from the top of the structure

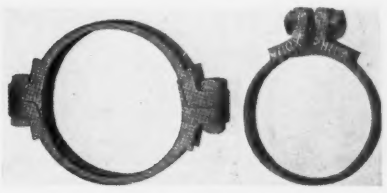
Malleable Hose Clamps

THE Rex hose clamps put on the market by the Knox Mfg. Co., Philadelphia, Pa., are malleable and made in sections. They will, when the requisite number are used, accompany any size of hose.

These clamps, say the manufacturers, can be pulled up very tightly and exert a uniform pressure over the entire circumference of the hose. They have another advantage in that the hose can be readily rolled to the desired location. The clamps are strong and pliable and will not stretch under tension nor the tongue curl up.

Sectional hose clamp

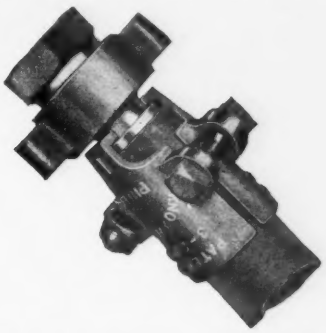
The company also manufactures couplings, nipples, hose menders and throttle valves. The "Knox" coupling is claimed to be especially adapted for steam and air drill service under the severest usage. It



Double bolt hose clamp

is constructed on the best mechanical principles. The clamps exert an equal pressure on its entire circumference and extend over collar on stem, thereby insuring safety under all pressures.

The "Knox" throttle valve is a heavy patterned standard thread valve, the body being constructed of malleable iron, with



Coupling for steam and air drills

extra heavy wall and strongly reinforced at the thread shoulder. The manufacturers say it will not close or jar open by vibration.

News of All the Industry

Incorporations

The Rokydale Stone Co., Inc., Roanoke, Va., has been incorporated for $75,000 to mine and deal in stone, lime, metals and minerals of all kinds. G. B. Pace is president; W. V. Gregory, secretary; and S. B. Pace, all of Roanoke.

The Magna Sand Corp. has been incorporated at Wilmington, Del., for $50,000, to deal in cement, sand, etc., by H. H. Neale, Philadelphia.

The W. M. Spencer Co., Kansas City, Mo., has been incorporated for $500,000 by W. M. Spencer, J. M. Cleary and others.

The General Sand and Gravel Co., Wilmington, Del., has been incorporated for $1,000,000.

The S. and L. Gravel Co., Kendalville, Ind., has been incorporated for $3,000 by L. Sadler and F. J. Latendresse.

The Plastic Products Co., 956 Macomb street, Detroit, Mich., has been incorporated for $25,000 to manufacture plastic cement, etc.

The Cerro Gordo Brick and Gravel Co. has been incorporated in Mason City, Iowa, for $150,000 by H. C. Boyd, C. L. Snyder, Mason City; and M. Pool, Elkader.

The Birdsboro Co. has been incorporated for $2,000,000 to operate a stone quarry by S. F. Glenn, J. M. Hutchinson, and J. F. Glenn, all of Philadelphia, Pa.

The Osage Sand and Constructing Co., Nevada, Mo., has been incorporated in Oklahoma for $25,000 by J. A. Daly.

Henry C. Arch & Son, Inc., 633 Desplaines avenue, Forest Park, Ill., has been incorporated for $75,000 by E. W. Arch, C. R. Arch, and H. G. Arch to manufacture and deal in quarry products, building materials, etc. Correspondent is E. W. Arch, 30 N. LaSalle street, Chicago.

The Central Roofing and Supply Co., Milwaukee, Wis., has been incorporated for $6000 by J. S. Danielski, J. Eder and Ida M. Bender.

The Laurel Hill Sand and Gravel Corp., Queens, N. Y., has been incorporated for $15,000 by M. C. Becker, J. W. Newman and H. H. Kutz.

The Ashland Limestone Co., Carter, Ky., has been capitalized at $100,000 by R. F. Hill, Jr., Orange, Va.; M. E. S. Posseg, Ashland, Ky., and W. S. Hoge, Washington, D. C.

The Bridgeport Sand and Gravel Co., Bridgeport, Conn., has been incorporated for $20,000 by Angelo Cocco and others all of Bridgeport.

The Fort Worth Building Supply Co. has been incorporated at Fort Worth, Texas for $10,000 by A. W. Flyn, F. D. Henderson and R. S. Phillips.

The American Marble and Tile Co., Atlanta, Ga., has been incorporated for $100,000 by E. F. Coggins, Canta, president; G. B. Thomson is vice-president and general manager.

The Sterrett Sand and Gravel Co., Springville, N. Y., has been incorporated for $20,000 by F. W. Sterrett, W. Sunderland, H. A. C. Grotke.

Sand and Gravel

The Marysville Sand and Gravel Co., Marysville, Calif., secured the contract to furnish sand for the work on irrigation ditches in Paradise Irrigation district in Butte county. The ditch will be lined with wire reinforced concrete 1½ in. thick, which will be done by Wyatt Brown, Paradise.

Everett, Wash.—The city commission has leased to R. Reardon and S. McGee a portion of Riverside dock on which to construct gravel bunkers. It is said a sand and gravel combine has for some time prevented establishment of independent bunkers here, and contractors have paid almost double the amount Seattle contractors do; the Seattle price is $1.15 to $1.25 a cu. yd., while Everett price is $2.25.

The Atlas Rock Co., Stockton, Calif., has been organized by A. C. McMillan of Fresno, who has purchased the gravel and rock plant operated by the Turlock and Modesto irrigation districts. The company will spend $35,000 in converting the plant to commercial uses.

The Lake Shore Sand Co., Chicago, Ill., has increased its stock from $20,000 to $200,000.

The C. W. Wilkinson Sand Co., Chicago, Ill., has increased its stock from $15,000 to $35,000 and increased directors from five to seven.

Lindsborg, Kan.—A gravel pit has been found six miles from here with material suitable for the hard-surfacing of streets and roads and material is being used from this tract for graveling 22 blocks here at a cost of $1440.

Bagnell, Mo.—J. M. Hayes will establish a plant here to supply gravel for the state highway for which he has a contract. It is believed by engineers that the depth of the bar at Bagnell is 20 ft., and 400 ft. long. Machinery and equipment have been installed, and the company will move its tiff mill from Eldon to Bagnell.

The Shreveport, La., Journal for February 28 states the Cotton Belt railroad has purchased from the State of Arkansas the sand and gravel rights in the Ouachita river about 50 miles north of Monroe for a sum of $50,000 or a price of 5 cents a cu. yd. for gravel and 2½ cents for sand. The company expects to get 1,250,00 cu. yd. of sand and gravel to ballast the railroad from St. Louis to Texas cities. The purchase was made possible through the passage of a bill in Arkansas legislature giving this right.

The Greenville Stone and Gravel Co., Hardy, Ark., is again operating after having been closed since last July on account of the car shortage.

The Mound Street Sand and Gravel Co., Columbus, Ohio, has awarded to the Sieburt-Milburn Co., the contract for machinery, also to furnish plans and specifications. The plant will have a capacity of 300 tons daily. They have also received a contract from the W. D. McGrath & Sons Co., for a 100-ft. boom steel derrick.

A. I. Miller and Sons, Clinton, Ind., has sold its sand and gravel business to the Neal Gravel Co., Mattoon, Ill.

The Great Eastern Gravel Corp., announces the location of its principal office has been changed from Buffalo to Port Jefferson, N. Y.

Reed and Wheelock, contractors, Clay Center, Kans., will operate a sand and gravel bed in the Republican river. A pump will be used to pump sand and gravel to the barges. It will be graded through the steel hose and pump and then loaded out as required. The material will be suitable for concrete work and as a base for paving. The Union Pacific is building a side track to the river, and sand can be pumped from the river into the cars; $10,000 to $12,000 will be spent on the plant.

Beaver Falls, Pa.—Representatives of the Pittsburgh Sand and Supply Co., and the Penn Bridge Co., College Hill, were present at the meeting of Rochester borough council to discuss council vacating about 100 foot of East Bank lane which is the rear of property purchased by the sand company, who wants to erect a hoist costing $40,000 on this land, and would allow the Penn Bridge Co., to use a portion of the land to erect 15 steel barges for the United States government. Council refused to vacate the land but offered a 3-year wharf lease.

Detroit, Mich.—Building costs in the border municipalities will jump, builders say, the price of gravel has advanced 50 cents per yd., and other material are due for a jump within the next month. Scarcity of labor will also affect building activity.

The Lansing Michigan Gravel Co., west of Mt. Hope, Mich., will increase production at its pits with the installation of a new 150 hp. electric motor to be used for elevating and washing gravel. The motor will be on a barge in the pit and sand and gravel sucked up by being mixed with water, then washed and screened, and delivered over various pipeways to different points along loading docks, according to grades and qualities.

Muscatine, Iowa.—The new switching rate on sand and gravel from the Automatic Gravel Co., Northern Gravel Co., Hahn-Muscatine Co., and Hahn Brothers' Gravel Co., to industries and team tracks on the Muscatine, Burlington & Southern railroad will be 1¼ cents per 100 lb., with a minimum of $8.10 per car, effective March 30.

The Lincoln Sand and Gravel Co., Lincoln, Ill., has leased an engine from the C. & A. yards at Bloomington, to do the switching for the company. An engine has also been leased from the Illinois Central for use this summer. The plant will be operating at full capacity within a few weeks and expects to put out an average of 50 cars per day.

Racine, Wis.—The Crescent Material Co., recently organized to develop a bed of building sand and gravel on the farm of J. T. McGrath, Caledonia, has filed a lease and will begin the erection of the necessary buildings in order to install the machinery.

Tell City, Ind.—The gravel plant here has started up again after being closed down for repairs. A busy season is looked for in this section. The two gravel plants at Rockport are also busy.

Quarries

Centralia, Wash.—The Tenino Stone Co. is considering opening a white stone quarry to enable it to bid on stone for federal and state buildings. At present the quarry is turning out sandstone bricks used to scrub the decks of ships.

The American Ochre Co., Luidelle building, Seattle, Wash., has found a deposit of kaolin, ochre, and sienna 5 miles north of Deering Park. This is claimed to be the only deposit in America. Tests made by the company show the bed covers 10 acres, with 8 ft. of kaolin under which is 6 ft. of ochre and under this is 5 ft.of sienna. These materials are all important in the manufacture of paint, paint colors, calcimine, paper, linoleum, porcelain of all kinds, chinaware, title pottery, etc. At present money is being raised to buy a steam shovel or stripper to remove overburden of 7 ft. of dirt and to purchase crusher, ball mill and dry kiln.

Bloomington, Ind.—According to operators in the Indiana Limestone industry, business outlook for the coming season is the most optimistic for several years. In a short time quarry and mill operations will open up on a large scale. Additional employes will be needed and to systematically meet these demands, the Bedford Stone club, through its employment bureau, is at present requesting all men in search of work to call at the office of the club, Gentry building, and register their names with A. M. Schram, in charge of this department in Bloomington, who will notify them as fast as openings are presented.

The Pratt Rock and Gravel Co., San Francisco, Calif., recently organized by C. F. Pratt, president of the Pratt Building Material Co. will soon build a $200,000 rock and gravel crushing plant between Sacramento and Folsom.

The Indiana Quarries Co., Bedford, Ind., is erecting a $500,000 mill, to replace the one destroyed by fire in July. Machinery is now being installed and the plant will be in operation about May 15. It will be one of the most modern and best equipped mills in the Indiana limestone producing regions, it is said.

Lima, Ohio—The Delphos Limestone Quarry Co., will furnish the stone to effect repairs on Lima avenue, an approach to the Harding highway.

Fond Du Lac, Wis.—The U. S. Bureau of Mines has a special car and corps of men here to give quarry foremen instruction in quarry safety work, consisting of 5 three-hour courses. The first shows how to stop bleeding; 2, application of bandages; 3, care of dislocations; 4, artificial respiration, and 5, transportation of the injured. The car is one of 10 sent out by the bureau, and contains all kinds of apparatus for doing mine rescue and first-aid work.

Little Rock, Ark.—The Golden Rule Stone Co., Guiyon, has decreased is capital stock from $12,500 to $6250; The Golden Rule Stone Co., of Flippin, from $12,000 to $7200.

The Kelley Construction Co., Wichita, Kans., contractors, has purchased from Albert and Jim Loyd, Sedan, their big stone crusher, and have moved it to Wichita.

The Columbia Quarries Co., operating quarries at Falling Springs and near Columbia, has decided to start a new quarry near Chester, Ill.

Conway, Ark.—H. R. Osborn, Morrilton and A. C. Virtue, Reno, have purchased from H. C. Carter the plant and business of the Conway Marble works.

Tiffin, Ohio—The France Stone Co., of which N. R. France is president, has purchased the Hopewell township quarry of the National Lime and Stone Co. The consideration was about $5500.

Detroit, Mich.—Much heavy machinery is being hauled from Alpena to Rockport for installation at the plant of the Kelley Island Lime and Transport Co., which is making extensive improvements on the property acquired from the Great Lakes Stone and Lime Co.

Greensburg, Ind.—F. Deiwert and E. E. Winker, have received a contract from the state to supply a large amount of crushed stone for use on state highways.

The Peter and Burchard Stone Co., Louisville, Ky., has increased its capital stock from $200,000 to $300,000.

Bee Rock, the government rock quarry, two miles from Searcy, Ark. on the Little Red river, from which stone is quarried for use in revetment work on the Mississippi near Vicksburg, has started work regularly.

Agstone

Sheffield, Ill.—Limestone in large quantity has been found on the A. Nordstrom farm in Arispie township in Bureau county. It tests high in calcium carbonate, one sample testing 89.9 per cent, another 91.55 per cent.

Virden, Ill.—For the month of March, Dolese and Shepard Co., Chicago, Ill. are selling limestone at 40 cents per ton, f. o. b. quarry. Freight rates on the Wabash are: Mt. Olive and Staunton, $1.10. On the C. B. & Q.; Virden, Girard, McVey, $1.45; Atwater, Medora, Piasa and Brighton, $1.50. The stone is equivalent to 98.18 per cent pure limestone and is ground fine.

Olewein, Iowa—A large number of farmers met at the Chamber of Commerce here and signed for 1200 tons of crushed limestone, in consideration of a crusher being established here. Three pits will be opened in various sections of the township.

Rockford, Ill.—Eight carloads of limestone were delivered to Boone county farmers during February, a special price of $1.30 having been made.

Galena, Ill.—A meeting was held at Massbach to form plans for the limestone grinding association in a number of townships, including committees from Pleasant Valley and Hanover. Analysis of all quarries will be made. Orders are being taken to deliver limestone to farms at $2.70 per ton. Any community where a suitable quarry can be located can have the work done after obtaining the consent of the association and securing orders for at least 400 tons of stone.

New Martinsville, W. Va.—Farmers of the Antiock Community Club, Wetzel County Farm Bureau, H. H. Thompson, agent, at its last meeting decided to get a lime crusher to crush their lime as needed.

Des Moines, Iowa—The state railroad commission handed down a decision in the hearing held last fall on rates for agricultural limestone, reducing rates from 12 to 20 per cent, depending upon the distance. Application for the reduction was made by the Iowa Farm Bureau Federation. No change was made in present freight rates for from 5 to 25 miles which is 40 to 54½ cents per ton.

Fairbank, Iowa—Farmers of the northeast part of Fairbank township at a recent meeting subscribed for 200 tons of limestone and a committee was formed to get other farmers to subscribe. A plan for buying a crusher was discussed.

Wheeling, W. Va.—D. W. Coffield of the Ohio County Farm Bureau reported to the local committee that six carloads of fertilizer limestone and soy beans had been received for distribution among the members and will be sold at practically cost. The committee is composed of F. W. Dorsey, Wheeling; J. B. Atkinson, West Alexander and R. B. White, Dallas.

Lancaster, Wis.—Prof. C. J. Chapman, a soils expert of the University of Wisconsin has discovered a large deposit of high-grade limestone on the Schneider brothers farm near here, testing 96 per cent pure. Schneider brothers will install a crushing and pulverizing machine at once to crush limestone.

Fred Braun, Algoma, Wis., has ordered a pulverizer to crush and pulverize limestone ranging in carbonate content as high as 99.03 per cent, in Door and Kewaunee counties. One-half of the soil in Kewaunee county is acid and at least half is in need of lime, H. A. Hoyde, instructor in agriculture at Algoma high school said.

Bloomington, Ill.—Meetings of farm bureaus in various townships have stimulated the ordering of limestone. The farm bureau is expecting the campaign to result in at least 100 cars or 8,000,000 lb. to be used this year. A reduction of 40 cents per ton is in effect until April 1.

Lime

The Keury Calcium Co., McGregor, Texas, has changed its name to the Waco Lime and Products Co.

Quincy, Calif.—H. C. Flornoy will construct a large lime kiln at his lime deposits near Virgilis.

Springfield, Mo.—The Ash Grove Lime and Portland Cement Co. plans to erect a modern power plant at its quarries north of Ash Grove. Definite plans for the power plant have not been perfected. The cost of the plant will be about $75,000.

The Hagerstown Lime and Chemical Co., Hagerstown, Md., is taking bids for its new plant, to include crushing and pulverizing machinery, mechanical drying equipment, etc. J. S. Meyers, president.

The O'Neal Lime Works, Inc., Calera, Ala., are perfecting plans for a new plant to cost $500,000 including machinery. The initial works will have 10 brick and steel kilns and a finishing plant to develop a capacity of 1,000,000 bbl. per annum.

Berryville, Ark.—H. H. Beal will establish a lime manufacturing plant here.

The Railroaders Lime Co., G. B. Crow, general manager, Corydon, Ind., will build several kilns and open a quarry.

The Union Carbide Co. has awarded the contract for erection of lime kiln buildings at Sault Ste. Marie, Mich., to cost $500,000.

The Ash Grove Lime and Portland Cement Co., Kansas City, Mo., will erect a $75,000 power plant at its quarries in Ash Grove, Mo. The company is also installing machinery in its hydration mill at the Galloway lime plant. The mill is to add the water necessary to the hydration of lime and will comprise two large storage bins, crushers, the hydration unit, pulverizers and air separator. The capacity will be approximately 8 tons per hour.

Woodlake, Calif.—A committee appointed by the farm bureau, consisting of E. I. Brown, D. C. Cole, F. G. Lund, A. Dinkins and E. B. Homer, called a meeting February 26, to consider establishing a lime-sulphur plant similar to the one at Lindsay for Woodlake, Lemon Cove, Elderwood, Klink and surrounding country.

Boston, Mass.—W. C. Hay of Los Angeles, Calif., has a process for preparing ready-mixed mortar and lime putty which reduces the cost to the consumer, increases the quality of the product, and eliminates waste and loss in production. He has obtained patents and has licensed the Blue Diamond Materials Co., of Massachusetts for the territory of Greater Boston.

Davenport, Iowa—The Port Byron Lime Association has employed an extra force of men and will erect a new kiln to take care of its large orders. G. E. Sudlow is manager.

York, Pa.—Fire of unknown origin destroyed the plant of the Emigsville Lime and Shale Co., near here. Preliminary plans are in progress for rebuilding the plant.

Cement

The Gulf States Portland Cement Co., the Dixie Portland Cement Co., and the Atlas Portland Cement Co. have divided the contract for 500,000 bbl. of cement to be used at Wilson Dam.

Martin's Creek—The Alpha Portland Cement Co., Easton, Pa., will make extensions and improvement in its local mill, including installation of a new power plant and waste heat equipment. Other apparatus will also be purchased. The company has arranged an appropriation of $1,000,000 for extensions and betterments in its other mills in different parts of the country.

The New York World states that more than three-fourths of the International Cement Corp.'s 8 per cent notes has been converted into stock. Of the original $1,500,000 issue, the amount still outstanding is $350.000. Common shares have been increased to 360,000.

The Petoskey Portland Cement Co., Petoskey-Mich., is operating at full capacity. It is purposed to create all possible reserves for spring distribution, totalling about 250,000 bbl. as now estimated.

Nazareth, Pa.—Cement mills in this vicinity are running at maximum and have sufficient orders on hand to continue on this basis until well into next fall.

Copley, Pa.—All cement mills in this vicinity are running full and will probably continue at this rate for an indefinite time.

Detroit, Mich.—At the annual meeting of the directors of the Egyptian cement plant here the following officers were elected: John Gillespie, president; C. A. Bragg, vice-president; E. R. Sullivan, secretary-treasurer. The company has spent $100,000 in improvements and repairs on its plant, and the present outlook indicates the largest business of its history.

Salt Lake City, Utah—The State of Utah seeks to recover refunds of $2391.31 and interest, in a complaint filed with the public utilities commission against the Bamberger Electric railroad, the Denver & Rio Grande Western railroad and James C. Davis, as federal railroad administrator. The complaint alleges that between August 1, 1919 and October 1, 1919 the railroad charged excessive rates on shipments of 70 carloads of cement from Devil's Slide and Bakers, Utah, to various places in the state. Allegation is made that the rates were contrary to the state and federal transportation laws. The complaint asks for a joint session of the public utilities commission and the interstate commerce commission to which a similar complaint has been addressed.

Gary, Ind.—Work has started on the $400,000 building program of the Universal Portland Cement Co. at its plant near Buffington. A new unit of buildings is to be constructed along the industrial highway between Indiana Harbor and Gary. A recreation building for employes, a new power plant and three large bunkhouses are included.

Gypsum

The American Gypsum Co. contemplates the erection of a $100,000 mill at Cleveland, Ohio.

The American Cement Plaster Co.'s plant near Ft. Dodge, Iowa, was partially destroyed by fire of unknown origin. The loss is estimated at $200,000.

J. Mugica, engineer, Tolosa, Spain, contemplates erecting a plant for calcining and grinding gypsum for plaster.

San Diego, Calif.—The Imperial Gypsum and Oil Co., with mines near Westmoreland, is expending $400,000 in development work, half of it going into a 25-mile spur line from the mine to Maria. The Maria plant is being erected and will be ready for operation as soon as the spur railway is completed. The properties comprise 20 acres of patented lands.

Vancouver, B. C.—Major Angus Davis, resident mining engineer for the Lillooet district gave a lecture at the B. C. chamber of mines on the mining developments in his district. Big developments are expected at Cedar Creek this summer, also in the Hemlock creek district where some very rich placer gold has been found. He referred to the deposits of non-metallic minerals found in his district such as sodium, sulphate, magnesium sulphate, gypsum, talc, etc., and said these were well worth investigating by commercial companies.

The Acme Cement Plaster Co.'s mill and warehouse at Beverley, near Grand Rapids, Mich., was destroyed by fire and the loss estimated at $150,000. It is believed the fire originated from an overheated boiler. The plant has been operating at full capacity and will be rebuilt immediately.

Toledo, Ohio.—Plaster interests are trying to locate industries near Port Clinton, and the territory west of Port Clinton will be tested for plaster, and leases have been requested from farmers in this district. There is much plaster and gypsum through Danbury, Portage, Bay, Erie and Carroll townships.

The King's Crown Plaster Co., Cedar Rapids, Iowa, is about to begin the erection of a $40,000 office building.

Silica Sand

Anderson, Ind.—The Philadelphia Quartz Works resumed operations March 2, for a run expected to last six weeks.

Marion, Ind.—The United Fuel and Supply Co., Detroit, Mich., has purchased a lake shore sand bank at Port Austin, Mich., which contains silica sand adopted to foundry and casting work. New docks are being constructed to ship the sand by water from Port Austin to Detroit.

Ardmore, Okla.—The Monterey Glass Works of Monterey, Mexico, may be induced to establish a large glass factory in or near Ardmore in its search for new glass sands. An analysis of the sand give the contents of silica 99.15; alumina oxide .12; iron oxide .71, which makes a good glass sand if the grain will permit melting at a reasonable heat.

C. B. McDanal, Irondale, Ala., is operating sand pits within 7 miles from Birmingham, which can be used for both foundry moulding and building purposes. The price of the sand is $1 at pit, delivery prices varying as to distance of delivery.

The New Castle Molding Sand Co., New Castle, Pa., plans extensive improvements at its plant which will cost $4000, and will include sand bins, chutes and screens, and a side-track in the company's molding sand deposit.

Concrete Products

The Altoona Products Co., New York, N. Y., has been incorporated for $50,000 by R. L. Taylor, Midway, Pa., A. W. Harper, E. J. Weber, Bridgeville, Pa.

Thomas and Borst, Rochester, N. Y., has been incorporated for $25,000 by W. and M. Thomas and J. Borst, to manufacture cement blocks.

The Brick-Con Metal Forms Co., Walla Walla, Wash., has been incorporated for $200,000 by J. S. Haispool and others.

The Gibralter Stone Works, Inc., Baltimore, Md., has been incorporated for $10,000 by E. Rosenblatt, E. Liepman, J. W. Archer.

The Lilley Concrete Products Co., Aurora, Ill., has been incorporated for $75,000 to manufacture concrete blocks and building material, by W. Lilley, W. H. Sperry, and J. S. Byrne, Aurora.

The California Concrete Vault Co., San Dimas, Cal., has been incorporated for $25,000.

The West Bend Concrete Products Co., West Bend, Wis., has completed its building, and machinery is now being installed. Duntile drain, building tile, building blocks, well tile, etc., will be produced.

The National Concrete Block Corp., New York, N. Y., has been incorporated for $150,000 by J. W. Magee, J. L. Magee and P. A. Magee of Pittsburgh.

Huntington Park, Calif.—The plant of the **Coast Concrete Products Co. is nearing completion** and when in operation will have a capacity of 3000 to 4000 concrete blocks of various sizes. The company will also have a building contracting business. It has been incorporated for $50,000 by B. Rosin, president; M. E. Pollosky, secretary-treasurer and S. Flan, superintendent.

The Kabell Concrete Products Co., Huntington, W. Va., has been incorporated for $25,000 by S. E. Cook, Huntington; V. O. Weathers, Ashland, Ky.; W. O. Brewer, Chillicothe, Ohio.

The Duluth Concrete Manufacturing and Supply Co., Duluth, Minn., has been incorporated for $50,000 by Harvey Hosheur.

The Nepperhan Concrete Products Corp., Yonkers, N. Y., has been incorporated for $15,000 by C. A. and E. M. Morales and L. P. Myers.

Phosphate Rock

Mt. Pleasant, Tenn.—The brown phosphate industry in and around here is operating its plants day and night because of the many orders being received.

Rantoul, Ill.—W. Z. Black, St. Joseph, kept a cost account of the work on his farm and reports that it cost 36 cents a bushel to produce the corn on 40 acres where he had applied 1000 lb. of rock phosphate per acre together with manure, and 49 cents a bushel on his other land.

Barton, Fla.—According to figures compiled by C. S. Hopkins, traffic manager of the Tampa Board of Trade, during February, 27,783 tons of phosphate were exported to foreign ports, 42,545 tons went coastwise, making a total of 70,283 tons. This is a considerable increase in shipment of any other February since the war, when the export used to be equal to the coastwise.

Dealers

The N. W. Davenport Cement Block Co., Davenport, Ia., established a number of years ago, was formally incorporated for $40,000. The company will manufacture and sell products of cement, together with building materials. J. G. Meir is president.

The Wm. H. Devos Co., Inc., Milwaukee, Wis., has been incorporated for $45,000 to deal in cement and concrete blocks. **Incorporators are W. H. Devos, J. A. Devos, and A. W. Devos.**

The Inman Builders Supply Co., Inman, S. C., has been incorporated by W. W. Moore, L. W. Moore and M. A. Moore, for $20,000.

The Florida Road Material Supply Co., Brookville, Fla., has been incorporated for $50,000 by J. A. Waddell, president; I. J. Waddell, secretary.

The Silverstone Plaster and Stucco Products Co., Indianapolis, Ind., has been incorporated for $100,000 by J. J. Briggs, C. A. Ittenbach, L. M. Briggs.

Rockford, Ill. — A half-million-dollar company will be organized here if plans for the proposed merger of the Hart Page, the Carrico Stone and Lumber Co., and the Rockford Sand and Gravel Co., are carried to completion.

The Builders Supply Inc., Portland, Maine, has been incorporated for $50,000 by P. J. Larrabee, C. E. McLaughlin, J. F. O'Brien, O. N. Goding and E. A. Turner.

The Southern Steel and Cement Co., Asheville, N. C., has been incorporated for $100,000 by J. E. Thayer, D. S. Elias and B. Elias, to deal in building materials.

The Crescent National Co., Racine, Wis., has been incorporated for $35,000 to deal in sand, gravel and crushed stone, by J. T. McGrath, M. E. Keefe and W. H. Miller.

The Enterprise Granite and Construction Corp. has been formed in Norfolk, Va., with a capital of $200,000, with R. T. Lipscomb, president, and M. Glenman, secretary.

Detroit, Mich.—Dallman & Danforth, 120 South Ferdinand street, has been incorporated for $10,000 to handle stone manufactured of concrete.

The W. J. Hammett Co., Baltimore, Md. has been incorporated for $10,000 by W. J. Hammett, E. Stolezo and D. Klein, to handle building material.

The Landers Lumber and Cement Co. Springfield, Mo., has been partially destroyed by fire with a loss estimated at $85,000.

Art Hagman, Priest River, Idaho, has purchased a warehouse and will handle cement, lime, etc.

Personal

Cloyd M. Chapman has become affiliated with Dwight P. Robinson & Co., Inc., as consulting materials engineer. Mr. Chapman, who has been active in the work of the American Society of Testing Materials and the American Concrete Institute, will in the future represent Dwight P. Robinson & Co. in the committee work of these societies.

J. M. Neptune has been appointed manager of the Columbus Gravel Co., Columbus, Ind. He has been one of the directors of the company for a number of years.

Joseph T. Atkins, former county highway superintendent, has been appointed superintendent of the lime and stone quarry at Marengo, Ind.

C. B. Chapman, Ottawa, Ill., at a meeting of the directors of the U. S. Silica Co., was made a member of the board to fill the newly created directorship.

J. R. Backstadt, former manager of the Chicago office of the Good Roads Machinery Co., has been transferred to the Kennett Square, Pa., office of the company in charge of the sand and **gravel and quarry machinery departments. His as**sistant, M. A. King, will remain in charge of the Chicago office.

William Coleman, of the Washington Brick and Lime Co., was among the speakers at a meeting of the bricklayers' and plasterers' union held at Spokane, Wash., and plans to supply and educate apprentice bricklayers and plasterers were discussed. It was agreed a committee of five, consisting of a man from each union, a contractor, brick manufacturer and a school representative, be named to work out a satisfactory arrangement to all interested.

Alvin U. Leh, of Trident, Mont., president of the Red Devil Cement Co. and state president of the Associated Industries and G. I. Martin of Butte, state manager, were guests of the Great Falls Associated Industries meeting, February 20 and spoke on the work of the state organization and plans for next year. State problems were discussed and state organizations plans presented.

J. I. McCants has returned to the cement industry of the South. Announcement has been made of his appointment as sales manager for the Signal Mountain Portland Cement Co., which is building a large plant at Chattanooga. From 1908 to 1920 as sales manager of the Standard Portland Cement Co. he was one of the outstanding figures in the building trade of the South. Under his management the plant of the Standard Portland Cement Co. at Leeds, Ala., grew from an annual capacity of 50,000 bbl. to 1,000,000. In 1920 the Leeds plant was sold to the Atlas Portland Cement Co. and Mr. McCants then became one of the organizers and vice-president of the Standard Fuel & Material Co. Later he became associated with the National Cement Co., leaving that company last year for other business interests.

J. L. Shiely of St. Paul, president of the Nineteenth District, Gravel and Sand Producers, gave an illustrated talk recently at a meeting of the Engineers' club of Minneapolis. Professor W. T. Ryan, university college of engineering, was among the other speakers.

Roy F. Imler, formerly associate editor of "Concrete Products," has taken charge of the service bureau of Thomas W. Noble & Co., Chicago. This company is the distributor of the concrete block machines and accessory equipment of the Universal Concrete Machinery Co., Peoria, Ill., and sales representative for Blystone batch mixers, Kent continuous mixers and Wirth bag cleaners. Mr. Imler, prior to his entry into the editorial fold, was engaged in construction work in the Chicago Engineering Bureau. He has written many articles on large engineering projects, highway construction activities and concrete products plant operations, and has visited numerous concrete-products factories and has made a careful analysis of the problems of the industry. The purpose of the bureau is to assist manufacturers in designing and equipping plants, to suggest labor-saving methods of operation, and to assist them in advertising and selling their products.

Manufacturers

W. A. Cather, publicity manager of the Worthington Pump and Machinery Corp., New York, has been promoted to the position of general sales assistant in charge of sales promotional work.

Changes in Westinghouse Branch Offices—Several changes in the branch offices of the Westinghouse Electric and Mfg. Co. have been announced by W. S. Rugg, general sales manager of that company. Two of the changes concern the managerships of two offices, the Baltimore and the Huntington, W. Va., branch offices. C. V. Woodward has been appointed manager of the former office and F. C. Reed has been made manager of the Huntington office. R. J. Ross has been appointed assistant manager of the transportation division of the Philadelphia office and W. F. James has been appointed manager of the industrial division of the Philadelphia office, succeeding R. F. Moon, who has resigned to accept the vice-presidency of the Atlantic Elevator Co., of New York.

A. W. Berghoefer, intimately known to the ice and coal trade, has again become associated with the Gifford-Wood Co., Hudson, N. Y., and will be located at the company's New York office at 50 Church street.

The Charter Gas Engine Co., Sterling, Ill., announces the purchase of the Mietz oil engine business, heretofore carried on at New York City by the August Mietz Corp. and the Reliance Oil Engine Corp. This effects a consolidation of two of the best-known internal combustion engines in the world. The Charter company is moving from New York City to its plant at Sterling, Ill., all of the physical assets, and in the meantime is filling repair orders from New York City so that there will be no interruption in repair service. A number of the personnel of the August Mietz Corp. have been engaged by the Charter company, insuring a thorough knowledge of the manufacture of its engines.

The Walter A. Zelnicker Supply Co., St. Louis, announces its removal from 325 Locust street to new offices in the Chamber of Commerce building, 511 Locust street. From its new offices the company looks back on its old quarters. The main plant and yards in East St. Louis cover 14 acres.

Trade Literature

Blast Hole Drills.—The Armstrong Mfg. Co., Waterloo, Iowa, has issued Bulletin No. 81, devoted to an illustrated description of its new No. 50 "all steel" blast hole drill, recently placed on the market. This machine, according to the company, is a complete unit of steel, including the derrick, and can be furnished with either a four-cylinder gasoline engine or an electric motor, at the buyer's option. The bulletin contains complete details.

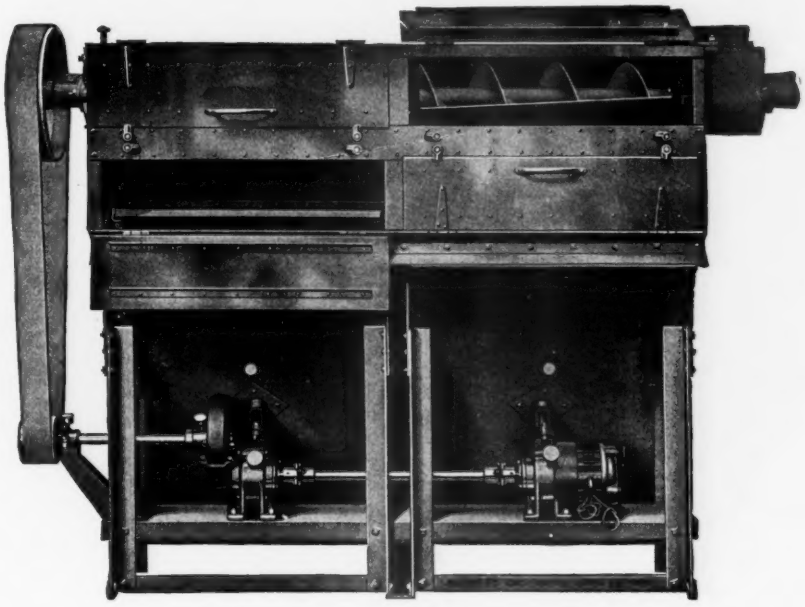
"Evolution of the Single-Roll Crusher"—This little folder relates the story of the crusher of this type manufactured by the McLanahan-Stone Machine Co., Hollidaysburg, Pa. The company states: "Soon after we began to furnish machinery for washing and preparing Florida phosphate rock we realized the necessity for a simple crusher which would reduce pieces too large for our double log washers. So we started to manufacture a single-roll crusher for this purpose. We furnished the first one in 1894." This crusher's development is interestingly told in brief form, together with mention of some of the large producers which are using the crusher today.

Centrifugal Pumps and Centrifugal Pumping Units—Bulletin No. 1632-F of the Allis-Chalmers Mfg. Co., Milwaukee, calls particular attention to its centrifugal pumps as adapted to all services where liquid is to be handled. One of the principal uses of centrifugal pumps is for fire protection where a sufficient pumping capacity to supply a reasonable quantity of water for a period of 10 hr. is recommended and it is advisable to have two sources of power available. Pumps for this service are usually built to conform to the specifications known as the "National Standard" adopted by the national fire boards and are called Underwriters' Fire Pumps. They cover four sizes—500, 750, 1000, and 1500 gal.; the working head is 100 lb. The cost of installation, it is said, is often paid for by the saving in insurance rates.

Blast Hole Drill—The Armstrong Mfg. Co., Waterloo, Iowa, has recently issued its Bulletin No. 81 describing the exclusive features of construction, control, and ease of operation. Together with the pertinent facts are descriptions of the patent wire line derrick, the tractor attachment, the engine and transmission, the sand reel, the band wheel clutch, the electric motor equipment, reversing transmission, the question of control, tool equipment, etc.

"Results on Road Jobs"—The Barber-Greene Co., Aurora, Ill., has recently published a booklet on this subject, in which the company says that "results on road jobs for several years prove that our loaders should be an essential part of practically every road job." Numerous jobs completed by the company are shown in illustration, together with data that presents the case of the manufacturers.

STURTEVANT



MOTO-VIBRO SCREEN

INEXPENSIVE BUT NOT CHEAP

It costs only about one-half as much as others but is better in quality, design, accessibility, durability, efficiency, capacity and vibration.

Why? Because—All unnecessary complications, delicate adjustments, auxiliaries, dangerous tension and destructive flexing have been eliminated.

Stripped of trouble, it is unique in effectiveness.

The "outs" of competitors do not exist in the Moto-Vibro.

Forty years of screening experience has made this possible.

This is not an idle boast—it is a fact, easily proven. Try it against any competitor—you are the judge.

WE SELL ON APPROVAL

The Moto-Vibro Screen is of Unit construction, one, two, or three screens per Unit. Operated electrically or by belt it is suitable for all requirements. It vibrates uniformly over entire screen area with no dead spots.

Eighteen hundred vibrations per minute of stinging intensity but of small amplitude. Noiseless, durable, compact and self contained.

STURTEVANT MILL CO. HARRISON SQUARE Boston, Mass.

Buyers' Directory
of the Rock Products Industry

Classified Directory of Advertisers in this issue of Rock Products

AERIAL TRAMWAYS
Interstate Equip. Co., New York, N. Y.

AIR COMPRESSORS
Worthington Pump & Mach. Corp., New York City, N. N.

AUTOMATIC WEIGHERS
Richardson Scale Co., Passaic, N. J.
Schaffer Eng. & Equipment Co., Pittsburgh, Pa.

BAGS AND BAG MACHINERY
Jaite Co., The, Jaite, Ohio

BELTING
Robins Conveying Belt Co., New York City, N. Y.

BINS
Austin Mfg. Co., Chicago, Ill.
Brown Hoisting Machinery Co., Cleveland, Ohio.
Link-Belt Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill. (storage).

BELT FASTENERS
Crescent Belt Fastener Co., New York City, N. Y.

BIN GATES
Allis-Calmers Mfg. Co., Milwaukee, Wis.
Austin Mfg. Co., Chicago, Ill.
Brown Hoisting Machinery Co., Cleveland, Ohio.
Link-Belt Co., Chicago, Ill.
Sturtevant Mill Co., Boston, Mass.
Traylor Eng. & Mfg. Co., Allentown, Pa.
Webster Mfg. Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill.

BLASTING SUPPLIES
Hercules Powder Co., Wilmington, Del.

BOILERS, WASTE HEAT
Freeman Mfg. Co., Racine, Wis.

BUCKETS—Elevator
Austin Mfg. Co., Chicago, Ill.
Brown Hoisting Machinery Co., Cleveland, Ohio.
Hendrick Mfg. Co., Carbondale, Pa.
Link-Belt Co., Chicago, Ill.
Orton & Steinbrenner, Chicago, Ill.
Webster Mfg. Co., Chicago, Ill.

BUCKETS, GRAB
Brown Hoisting Machinery Co., Cleveland, Ohio.
McMyler Interstate Co., Cleveland, Ohio.

CABLEWAYS
Interstate Equip Co., New York, N. Y.
Link-Belt Co., Chicago, Ill.

CALCINING MACHINERY
Atlas Car & Mfg. Co., Cleveland, Ohio.
Butterworth & Lowe, Grand Rapids, Mich.

CARS—Quarry and Industrial
Atlas Car & Mfg. Co., Cleveland, Ohio.

CAR PULLERS
Link-Belt Co., Chicago, Ill.
Mining Machine Co., Mountville, Pa.
Weller Mfg. Co., Chicago, Ill.

CEMENT MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Kennedy-Van Saun Mfg. & Eng. Corp., New York City.

CHAIN
Carroll Chain Co., Columbus, Ohio.
Morse Chain Co., Ithaca, N. Y.

CLUTCHES
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill.

CONVEYORS AND ELEVATORS
Kennedy-Van Saun Mfg. & Eng. Corp., New York City.
Link-Belt Co., Chicago, Ill.
Smith Eng. Works, Milwaukee, Wis.
Robins Conveying Belt Co., New York City.
Sturtevant Mill Co., Boston, Mass.
Universal Road Mach. Co., Kingston, N. Y.
Webster Mfg. Co., Chicago, Ill.

CRANES—Crawling Tractor
Industrial Works, Bay City, Mich.

CRANES—Locomotive Gantry
Brown Hoisting Machinery Co., The, Cleveland, Ohio.
Byers Mach. Co., The, Ravenna, Ohio.
Erie Steam Shovel Co., Erie, Pa.
Industrial Works, Bay City, Mich.
Koehring Co., Milwaukee, Wis.
Link-Belt Co., Chicago, Ill.
McMyler-Interstate Co., Cleveland, Ohio.
Northwest Engineering Co., Chicago, Ill.
Ohio Locomotive Crane Co., Bucyrus, Ohio.
Orton & Steinbrenner, Chicago, Ill.
Osgood Co., The, Marion, Ohio.

CRUSHERS AND PULVERIZERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulverizer Co., St. Louis, Mo.
Austin Mfg. Co., Chicago, Ill.
Austin-Western Road Mach. Co., Chicago, Ill.
Buchanan Co., Inc., C. G., New York, N. Y.
Butterworth & Lowe, Grand Rapids, Mich.
Fuller-Lehigh Co., Fullerton, Pa.
Good Roads Machinery Co., Kennett Square, Pa.
K. B. Pulverizer Co., New York, N. Y.
Kennedy-Van Saun Mfg. & Eng. Corp., New York, N. Y.
Kent Mill Co., Brooklyn, N. Y.
Lewistown Fdry. & Mach. Co., Lewistown, Pa.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
Morgan Engineering Co., Alliance, Ohio.
Munson Mill Machinery Co., Utica, N. Y.
New Holland Machine Co., New Holland, Pa.
Pennsylvania Crusher Co., Philadelphia, Pa.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
Smith Eng. Works, Milwaukee, Wis.
Sturtevant Mill Co., Boston, Mass.
Traylor Eng. & Mfg. Co., Allentown, Pa.
Universal Crusher Co., Cedar Rapids, Iowa.
Universal Road Mach. Co., Kingston, N. Y.
Webb City and Carterville Fdy. and Mach. Co., Webb City, Mo.
Williams Pat. Crush. & Pulv. Co., Chicago, Ill.
Worthington Pump & Mach. Corp., New York City, N. N.

CRUSHER REPAIRS—Manganese Steel
American Manganese Steel Co., Chicago Heights, Ill.

DERRICKS
American Hoist & Derrick Co., St. Paul, Minn.

DIPPER TEETH
American Manganese Steel Co., Chicago Heights, Ill.

DRILLS
Sanderson Cyclone Drill Co., Orrvun Ohio.

DRILLERS
Pennsylvania Drilling Co., Pittsburgh, Pa.

DRYERS
American Process Co., New York City.
Fuller-Lehigh Co., Fullerton, Pa.
Lewistown Fdy. and Mach. Co., Lewistown, Pa.
Ruggles-Coles Engineering Co., N. Y. City.
Vulcan Iron Works, Wilkes-Barre, Pa.
Weller Mfg. Co., Chicago, Ill.

DUST COLLECTING SYSTEMS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DYNAMITE
Hercules Powder Co., Wilmington, Del.

ENGINES—Steam
Morris Mach. Works, Baldwinsville, N. Y.

ENGINEERS
Buckbee Co., J. C., Chicago, Ill.
Hunt, R. W., & Co., Chicago, Ill.
Richard K. Meade & Co., Baltimore, Md.
Schaffer Eng. & Equip. Co., Pittsburgh, Pa.
Webster Mfg. Co., Chicago, Ill.

EXCAVATORS
Brown Hoisting Machinery Co., Cleveland, Ohio.
Erie Steam Shovel Co., Erie, Pa.
Koehring Co., Milwaukee, Wis.

EXCAVATORS—Dragline Cableway
Link-Belt Co., Chicago, Ill.
Sauerman Bros., Chicago, Ill.

EXPLOSIVES
Hercules Powder Co., Wilmington, Del.

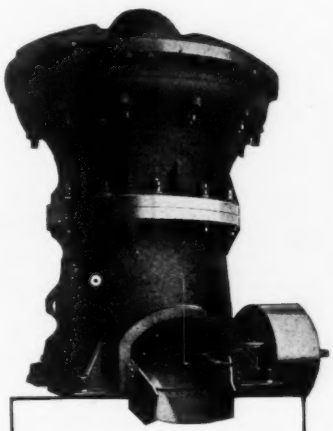
GAS PRODUCERS
Morgan Construction Co., Worcester, Mass.
R. D. Wood & Co., Philadelphia, Pa.

GEARS
Link-Belt Co., Chicago, Ill.

GLASS SAND EQUIPMENT
Lewistown Fdy. & Mach. Co., Lewistown, Pa.

GRINDING MILLS
Munson Mill Machinery Co., Utica, N. Y.

This Crusher Was Tested For Three Years With Hard Granite



SUPERIOR McCULLY CRUSHER

Special Features

Shaft 60 per cent. stronger than in standard gyratories.

Spider Hub absolutely rigid.

Improved dust collar keeps bottom shell clean.

Gear pump floods eccentric and gearing with oil—longer life.

Cut steel gear and pinion—less wear—less friction.

Has low maintenance cost.

The first Worthington Superior McCully Crusher was tested for three years before it was offered for sale. It was a new type of gyratory at that time (1909) and Worthington felt that three years of crushing hard granite was a necessary test before any one could be absolutely sure the crusher would do its work properly.

The fact that there are now over three hundred Worthington Superior McCully Gyratory Crushers in operation, shows that this policy of "test first, then market" has been appreciated by those who use crushers.

WORTHINGTON PUMP AND MACHINERY CORPORATION

Executive Offices; 115 Broadway, New York City

Branch Offices in 24 Large Cities

PRODUCTS OF THE POWER AND MINING WORKS

Jaw Crushers
Apron Feeders for Jaw Crushers
Screens
Bucket Elevators
Tube Mills
Dryers and Coolers
Crushing and Cement Mill Machinery
Rotary Kilns
Gyratory Crushers
Crushing Rolls
Ball Mills
Rod Mills
Woodbury Jigs
Converters
Blast Furnaces
Mining Equipment

W-159.8

WORTHINGTON

Deane Works, *Holyoke, Mass.*
Blake & Knowles Works *East Cambridge, Mass.*
Worthington Works *Harrison, N. J.*
Laidlaw Works, *Cincinnati, Ohio.*

Gas Engine Works, *Cudahy, Wis.*
Power & Mining Works *Cudahy, Wis.*
Snow-Holly Works *Buffalo, N. Y.*

Buyers' Directory
of the Rock Products Industry

Classified Directory of Advertisers in this issue of Rock Products

GRIZZLIES
Robins Conveying Belt Co., New York City.

HOISTS
American Hoist & Derrick Co., St. Paul, Minn.
Austin Mfg. Co., Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Thomas Elevator Co., Chicago, Ill.
Vulcan Iron Works, Wilkes-Barre, Pa.
Weller Mfg. Co., Chicago, Ill.

HOSE
Robins Conveying Belt Co., New York City, N. Y.

HYDRATING MACHINERY
Atlas Car & Mfg. Co., Cleveland, Ohio
Kritzer Co., The, Chicago, Ill.
Miscampbell, H., Duluth, Minn.
Schaffer Eng. & Equip. Co., Pittsburgh, Pa.
Toepfer & Sons Co., W., Milwaukee, Wis.

HYDRAULIC DREDGES
Morris Machine Works, Baldwinsville, N. Y.

INSULATION
Celite Products Co., Chicago, Ill.

LIME HANDLING EQUIPMENT
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill.

LIME KILNS
Vulcan Iron Works, Wilkes-Barre, Pa.
Worthington Pump & Mach. Corp., New York City, N. N.

LOADERS AND UNLOADERS
Brown Hoisting Machinery Co., Cleveland, Ohio.
Erie Steam Shovel Co., Erie, Pa.
Link-Belt Co., Chicago, Ill.
Orton & Steinbrenner, Chicago, Ill.

LOCOMOTIVES
Baldwin Locomotive Works, The, Philadelphia, Pa.
Fate-Root-Heath Co., Plymouth, Ohio.
Hadfield-Penfield Steel Co., Bucyrus, Ohio.
Ironton Engine Co., Ironton, Ohio.
Lima Locomotive Works, New York, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Co., Geo. D., Rochelle, Ill.

MANGANESE STEEL REPAIRS
Hadfield-Penfield Steel Co., Bucyrus, Ohio

MILLS (Grinding, Etc.)
Fuller-Lehigh Co., Fullerton, Pa.
Kent Mill Co., Brooklyn, N. Y.
Munson Mill Mach. Co., Utica, N. Y.
Sturtevant Mill Co., Boston, Mass.

MOTOR TRUCKS
Traylor Eng. & Mfg. Co., Allentown, Pa.

PAINT AND COATINGS
Williams, C. K., & Co., Eaton, Pa.

PERFORATED METALS
Cross Eng. Co., Carbondale, Pa.
Hendrick Mfg. Co., Carbondale, Pa.

PLASTER MACHINERY
Butterworth & Lowe, Grand Rapids, Mich.

PORTABLE CONVEYORS
Link-Belt Co., Chicago, Ill.

POWDER
Hercules Powder Co., Wilmington, Del.

POWER TRANSMITTING MACHINERY
Link-Belt Co., Chicago, Ill.
Webster Mfg. Co., Chicago, Ill.

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Manganese Steel Co., Chicago Heights, Ill.
Emerson Pump and Valve Co., Alexandria, Va.
Morris Machine Works, Baldwinsville, N. Y.
Traylor Eng. & Mfg. Co., Allentown, Pa.
Worthington Pump & Mach. Corp., New York City, N. N.

PULLEYS
Link-Belt Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill.

PULVERIZED FUEL EQUIPMENT
Raymond Bros. Impact Pulv. Co., Chicago, Ill.

QUARRY EQUIPMENT
Universal Road Mach. Co., Kingston, N. Y.

ROAD MACHINERY
Austin-Western Road Mach. Co., Chicago, Ill.

ROPE, WIRE
American Steel & Wire Co., Chicago, Ill.
Leschen, A., & Sons Co., St. Louis, Mo.

SAND SETTLING TANKS
Good Roads Machinery Co., Kennett Square, Pa.

SCALES
Richardson Scale Co., Passaic, N. J.

SCRAPERS, DRAG
Link-Belt Co., Chicago, Ill.
Sauerman Bros., Chicago, Ill.

SCREENS
Austin Mfg. Co., Chicago, Ill.
Austin-Western Road Mach. Co., Chicago, Ill.
Cross Eng. Co., Carbondale, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Lewistown Fdy. and Mach. Co., Lewistown, Pa.
Link-Belt Co., Chicago, Ill.
New Holland Machine Co., New Holland, Pa.
Robins Conveying Belt Co., New York City, N. Y.
Smith Eng. Works, Milwaukee, Wis.
Sturtevant Mill Co., Boston, Mass.
W. Toepfer & Sons Co., Milwaukee, Wis.
Traylor Eng. & Mfg. Co., Allentown, Pa.
Twin City Iron & Wire Co., St. Paul, Minn.
Tyler Co., The, W. S., Cleveland, Ohio.
Universal Road Mach. Co., Kingston, N. Y.
Webster Mfg. Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill.

SEPARATORS
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Sturtevant Mill Co., Boston, Mass.
Tyler Co., The W. S., Cleveland, Ohio.

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Brown Hoisting Machinery Co., Cleveland, Ohio.
Erie Steam Shovel Co., Erie, Pa.
Northwest Engineering Co., Chicago, Ill.
Orton & Steinbrenner Co., Chicago, Ill.
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SPROCKET CHAIN
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STEEL PLATE CONSTRUCTION
Hendrick Mfg. Co., Carbondale, Pa.

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STUCCO FACINGS
Metro-Nite Co., Milwaukee, Wis.

TANKS, STEEL STORAGE
Traylor Eng. & Mfg. Co., Allentown, Pa.

TESTING SIEVES AND TESTING SIEVE SHAKERS
Tyler Co., The W. S., Cleveland, Ohio

TRAMWAYS
Interstate Equip. Co., New York, N. Y.

TRANSMISSION MACHINERY
Link-Belt Co., Chicago, Ill.
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WASHERS, SAND AND GRAVEL
Lewistown Fdy. and Mach. Co., Lewistown, Pa.
Link-Belt Co., Chicago, Ill.
Smith Eng. Works, Milwaukee, Wis.

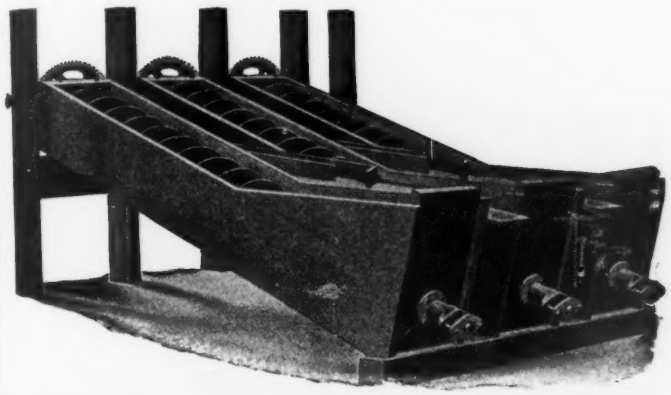
WEIGHING EQUIPMENT
Richardson Scale Co., Passaic, N. J.

WIRE ROPE
American Steel & Wire Co., Chicago, Ill.
Leschen, A., & Sons Co., St. Louis, Mo.

WIRE CLOTH
Cleveland Wire Cloth Co., Cleveland, Ohio.
Twin City Iron & Wire Co., St. Paul, Minn.
Tyler Co., The W. S., Cleveland, Ohio.

Mr. Sand Man!

IF it's clean sand you want to produce and you are unable to do so, write to us and state your trouble and we can help you to solve your problem. We make machinery that produces the cleanest Glass Sand.



The Lewistown Equipment, which includes Crushing, Grinding, Screening, Washing, Drying and Conveying Machinery, will produce more and a better quality of Glass Sand, at a bigger profit than any other equipment on the market.

LEWISTOWN FOUNDRY & MACHINE COMPANY
Lewistown, Pa.

Real Performance

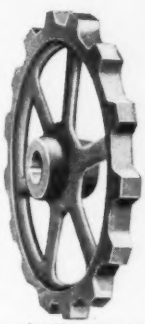
Consider exactly what you need in repair parts.

Dependability and ***uninterrupted service.*** You want the sort of performance ***you*** consider efficient and economical.

ERA Manganese Steel Repair Parts give you everything you want along these lines. They are economical because they last longer, and they are backed by 40 years of Hadfield experience.

Gyratory Crusher Parts—Heads, Concaves and Renewable Mantles, Gears and Pinions and Wearing Plates.

Jaw Plates, Cheek Plates, Toggles and Toggle Bearings. Standard detachable chains of all sizes and Sprocket Wheels.

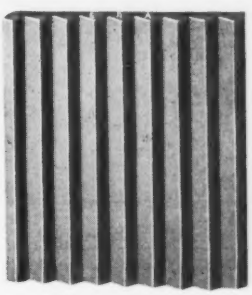


MANGANESE

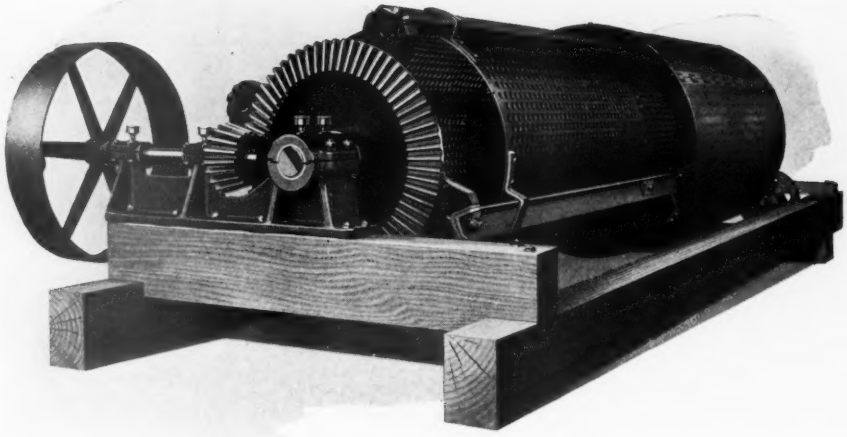
THE FIRST ERA STILL LEADS IN QUALITY

STEEL

THE HADFIELD-PENFIELD STEEL COMPANY
BUCYRUS, OHIO



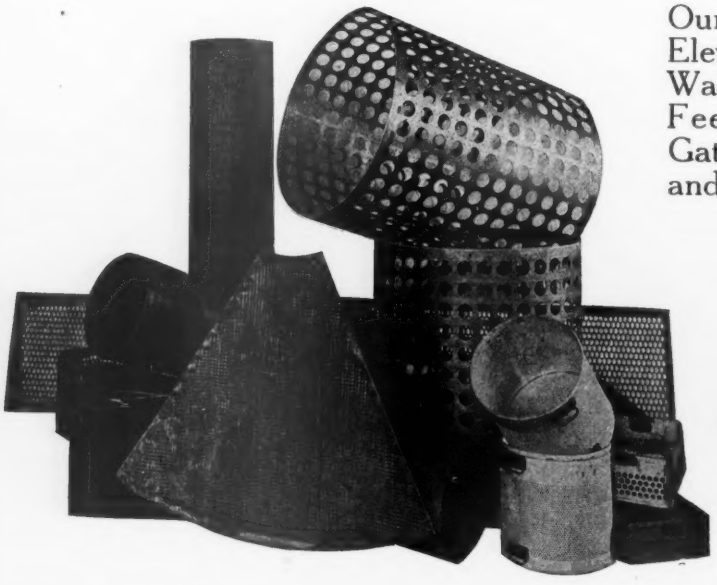
When writing advertisers please mention ROCK PRODUCTS



Toepfer Products

If there is any secret about the high investment value of Toepfer Products and about the tremendous hold they have on quarry operators, it can be explained by the simple fact that they are especially long-lived, especially faithful in service.

Back of it all, of course, is the way they are built. The best engineering brains, backed by a thorough knowledge of the conditions, build them to stand up under the use and frequently the abuse they receive in the hands of producers.

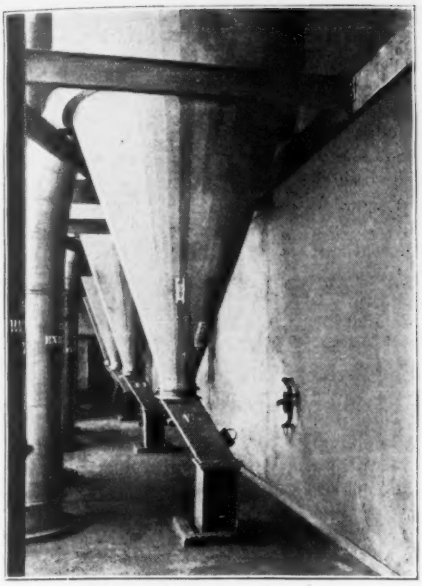


Our Products also include Elevators, Sand Washers, Washing Screens, Grizzlys, Feeders, Conveyors, Bin Gates, Perforated Metals, and Hydrators.

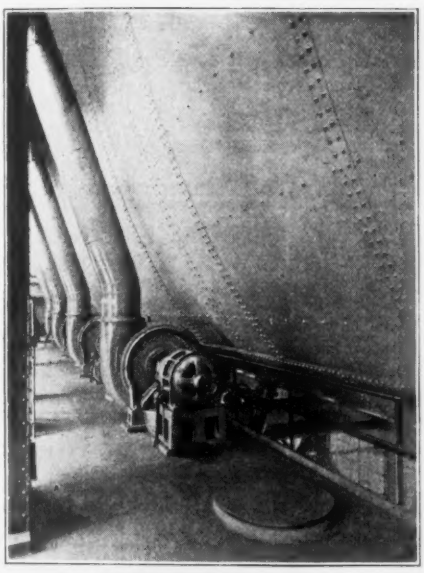
Send in your order for screen replacements. You will get the service you demand.

W. TOEPFER & SONS COMPANY

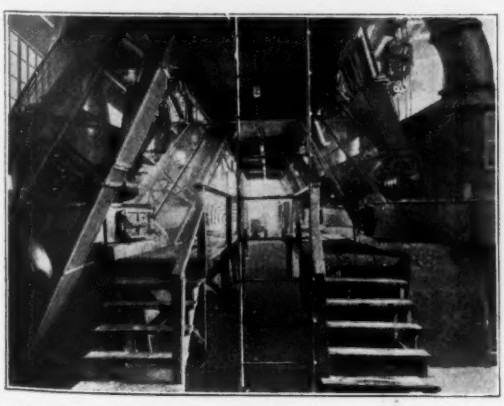
80 Menomonee Street
Milwaukee, Wis.



Cyclone Collectors



Special Exhaust Fans



The above views show parts of the Eight Mill Powdered Coal Installation at the boiler plant of the Ford Motor Co., Detroit

The Record of Raymond Roller Mills Grinding Coal in This Plant Speaks for Itself

Initial four Mills installed July, 1920.

Two added June, 1922.

Two more added January, 1923.

And—Two more will be installed in a Cement Plant being built by this Company now.

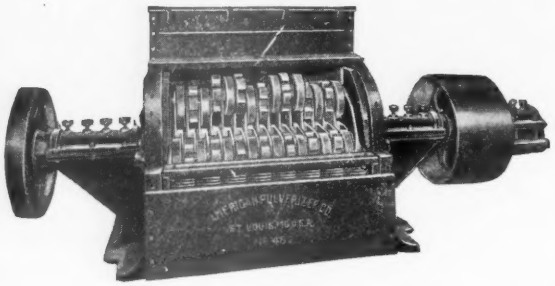
Raymond Roller Mills for powdering Coal require less power, less maintenance and less labor attendance than any other machines ever used for this purpose.

Raymond Bros. Impact Pulverizer Co.

1301 N. BRANCH ST. CHICAGO, ILL.

Eastern Office, 50 Church St., NEW YORK CITY
Western Office, 1002 Washington Bldg., LOS ANGELES

AMERICAN RING PULVERIZER



IT is a noteworthy fact that operators hold a sincere regard for the American Ring Pulverizer because of its dependability in contributing so largely to the success of the plants.

One user said: "If we were in the market for another pulverizer, we would buy an American."

Another: "We are well pleased with its operation."
Another: "Upkeep on this mill has been very low."
Another: "We cannot speak too highly of the American."
Another: "It has fulfilled all the claims made for it by the manufacturers."

After all, user satisfaction is the final test.

AMERICAN PULVERIZER CO., 18th & Austin, St. Louis, Mo.

WELLER-MADE EQUIPMENT

For Handling the Materials Mechanically

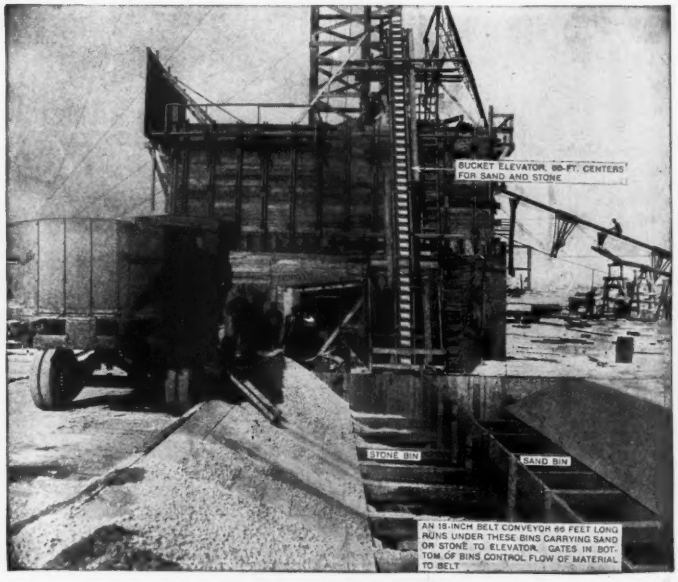
Increase the Output and Reduce Costs by Employing Weller-Made Machinery to Do the Work

It is sturdy and reliable. Never lays down on the job. The cost of operation is small. Will help pay dividends.

We Make
Conveyors of All Types

Bucket Elevators	**Portable Elevators**
Steel Storage Bins	**Bin Gates**
Screens	**Sheet Metalwork, etc.**

Write and let us know the kind of equipment you are interested in or the material you want to handle. Catalogues showing installations, also data to help in selection of equipment, will be sent.


BUCKET ELEVATOR, 66-FT. CENTERS FOR SAND AND STONE
STONE BIN
SAND BIN
AN 18-INCH BELT CONVEYOR 66 FEET LONG RUNS UNDER THESE BINS CARRYING SAND OR STONE TO ELEVATOR. GATES IN BOTTOM OF BINS CONTROL FLOW OF MATERIAL TO BELT

WELLER MFG. CO.

1820-1856 North Kostner Avenue **SALES OFFICES** **Chicago, Illinois**

New York **Boston** **Baltimore** **Pittsburgh** **Cleveland** **San Francisco** **Salt Lake City**

POOR TRACK MEANS NOTHING TO A SHAY

SHAY Geared Locomotives are built for quarry and excavating service. This usually involves rough, quickly laid track.

Because of the Shay's low center of gravity and evenly-distributed wheel loads, the Shay is less liable to derailment.

The construction of the driving truck gives the Shay the same freedom of motion as a box car truck, enabling Shays to adjust themselves to "bad spots" in the track.

Complete construction details of the Shay Geared Locomotive and its adaptability to your needs are described in the Shay Catalog. Write for a copy.

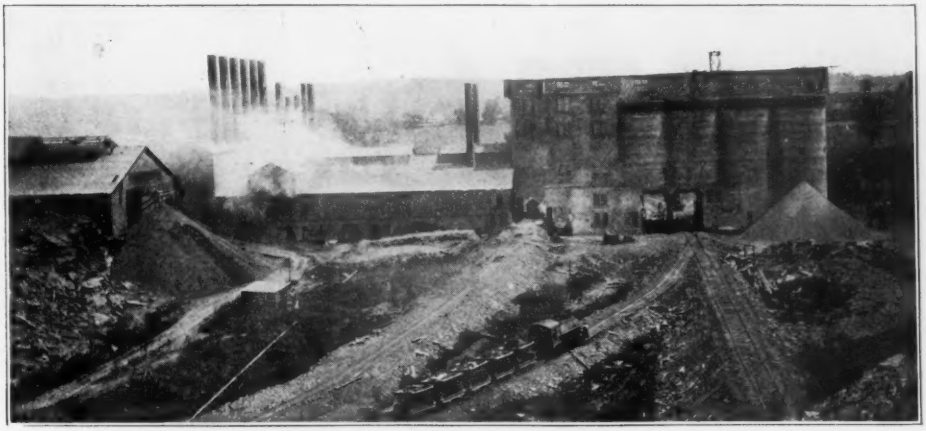
LIMA LOCOMOTIVE WORKS, Incorporated

Lima, Ohio 17 East 42nd Street, New York

VULCAN Locomotives

The engraving below is a general view of the plant operated by the Giant Portland Cement Company, Egypt, Pa.

Vulcan Locomotives are in use at this plant, delivering the same service performance that has given these machines a universal reputation for dependability.

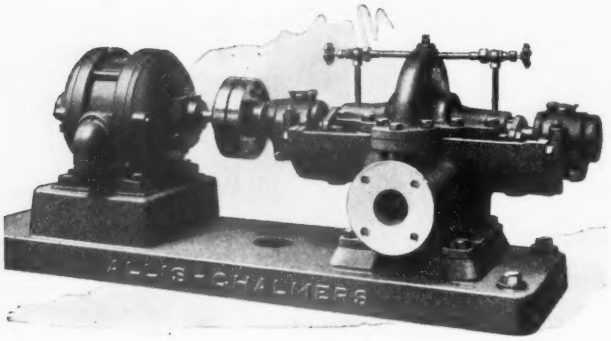


Vulcan locomotive hauling train of five quarry cars to crushing plant

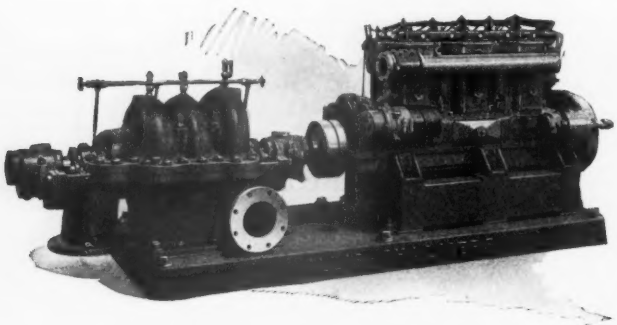
VULCAN IRON WORKS, Established 1849

1753 Main Street **Wilkes-Barre, Pa.**

CENTRIFUGAL PUMPS
FOR
ROCK PRODUCTS INDUSTRIES



The above pump is the standard type "S" which is the most generally used. It is a high grade pump and so liberally designed that it will stand up under the hardest kind of service. Type "S" pumps are ideal for gravel washing and similar purposes.



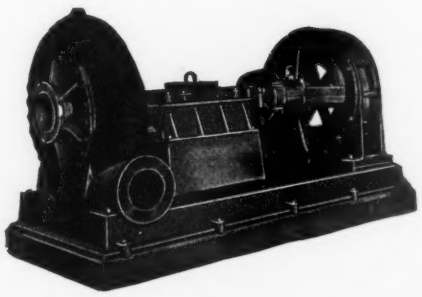
The cut shows a gasoline engine driven high pressure pump suitable for stripping and sluicing service when electric power is not available. It is also used as a fire pump when one is required.

ALLIS-CHALMERS
MANUFACTURING COMPANY

ELECTRICAL MACHINERY
STEAM TURBINES — STEAM ENGINES
HYDRAULIC TURBINES
GAS ENGINES — OIL ENGINES
MINING MACHINERY
CRUSHING AND CEMENT MACHINERY
FLOUR AND SAW MILL MACHINERY

PUMPING ENGINES
CENTRIFUGAL PUMPS
CONDENSERS
AIR COMPRESSORS — AIR BRAKES
STEAM AND ELECTRIC HOISTS
AGRICULTURAL MACHINERY
POWER TRANSMISSION MACHINERY

MILWAUKEE, WISCONSIN. U.S.A.



Heavy Service Dredging Pump

Where conditions are too severe for our standard sand pump, the above type is recommended.

It is built in sizes from 4 in. up, arranged for belt, motor, or engine drive.

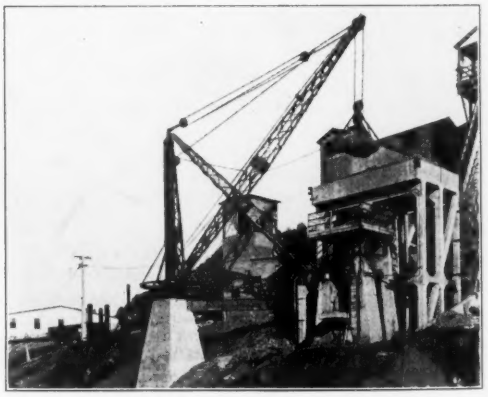
MORRIS MACHINE WORKS
50 Genesee St. Baldwinsville, N. Y.

39 Cortlandt St., New York City
Forrest Bldg., Philadelphia, Pa.
217 N. Jefferson St., Chicago, Ill.
Penobscot Bldg., Detroit, Mich.

Bulletin No. 19-B fully describes our complete line of sand and dredging pumps. Have you your copy?

MORRIS

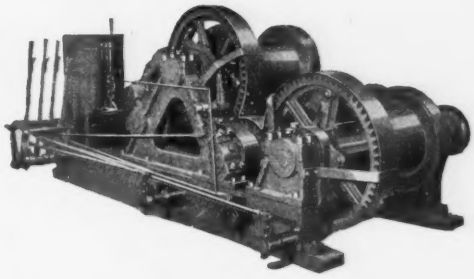
Since the Civil War Builders of Centrifugal Pumps, Hydraulic Dredges, and Steam Engines



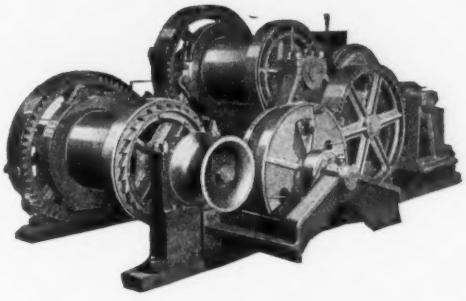
The magnificent new plant of the Dixie Sand & Gravel Co. at Chattanooga, Tenn., is served by an "AMERICAN" 15-ton Stiffleg Steel Derrick, operated by a 75 HP. "AMERICAN" Electric Hoist and a 22 HP. "AMERICAN" Independent Slewer. This derrick handles all incoming materials, transferring them from the scow to the main hopper. The capacity operation of the entire plant hinges upon the ability of the "AMERICAN" Derrick to keep it fed up.

AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minn.
New York - Chicago - Pittsburgh - Seattle - New Orleans - Detroit

THOMAS HOISTS



Single and Two Speed Types



Designed and built for every requirement of the Sand, Gravel and Stone Producer.

For

Dragline Cableways
Drag Scrapers
Derricks
Bucket Operation
Car Haulage

THOMAS ELEVATOR COMPANY

27 South Hoyne Avenue **Chicago, Ill.**

"CARROLL" SOLID WELD

STEAM SHOVEL CHAINS must be GOOD chains to insure continuous operation and consequent production.

"CARROLL" Solid Weld Steam Shovel Chains are the very best and just naturally render that desirable, satisfactory service.

Use them!

Know them!!

You will appreciate them!!!

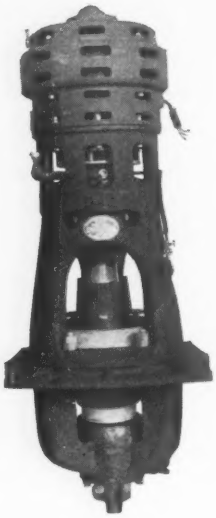
THE CARROLL CHAIN COMPANY

Columbus, Ohio

CHAINS

The New Weston Direct Drive Gyratory Crusher for Secondary Reduction of Hard Rock, Ore and Gravel

A BETTER CRUSHER BECAUSE



Gears, Countershafts and Belts are eliminated. Eccentric is at the top, is Bronze Bushed and oil floated.

Entrance of dust into oil supply and bearings is absolutely prevented.

By removing six bolts—machine can be taken apart with crane or derrick.

Capacity is 3 to 5 times greater than geared gyratories.

Power consumption is exceptionally low.

Construction is all steel with Chrome-Vanadium Molybdenum forged steel shaft.

Built in six standard sizes—largest size takes 12-inch rock rejecting 350-450 tons per hour. Smallest machine when set to 1¾ inches rejects 120 tons per hour, or 40 tons per hour with ½-inch setting.

Send for Bulletin 25 Which Describes This Machine in Detail

THE MORGAN ENGINEERING COMPANY
ALLIANCE, OHIO

Pittsburgh
1420 Oliver Bldg.

Designers, Manufacturers and Contractors
Electric Traveling Cranes, Rolling Mill Machinery
Ordance, Steel, Shipbuilding and Forging Plants Complete
Rock Crushers, Special Machinery for Any Purpose

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122 S. Michigan Ave.
Birmingham, Ala.
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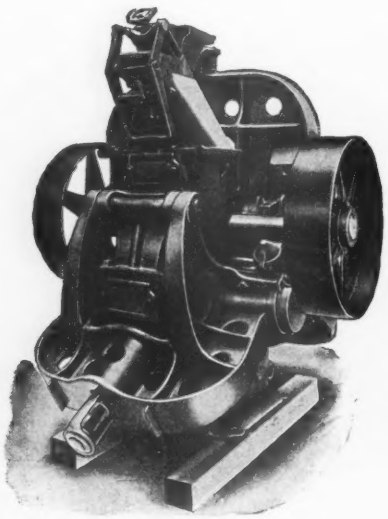


MAXECON MILL

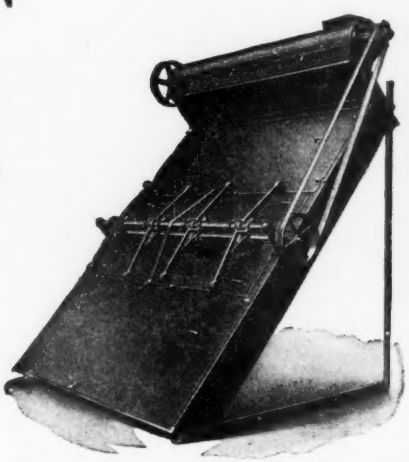
For Fine Pulverizing of

Limestone, Gypsum, Phosphate, etc.

EFFICIENT—ECONOMICAL—RELIABLE

PERFECTECON SCREEN SEPARATOR

For Large Capacity Screening



Let These Solve Your Cost and Trouble Problems

KENT MILL COMPANY
10 Rapelye Street **Brooklyn, N. Y.**

Austin Motor Rollers

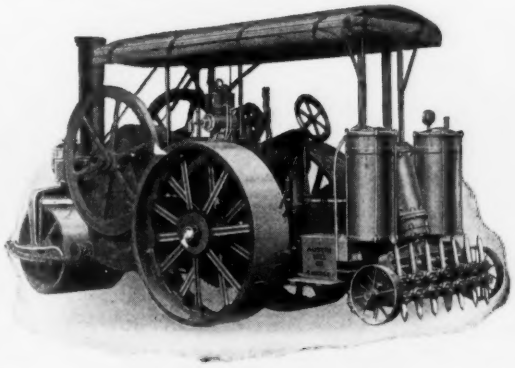
"They Serve You Right"

Everything you expect of a road roller you will find in the Austin Motor Roller to a greater degree than in any other.

Economical to operate and maintain, able to turn out more work in a given time than any other, and absolutely reliable — your first experience with one of these machines will be a revelation of REAL ROLLER SERVICE.

Three-wheeled rollers in two styles (single or twin engines) and five sizes (7, 8, 10, 12 and 15 ton)—there is a style and size exactly suited to your individual requirements. Pneumatic scarifier can be attached to the 10-ton and larger sizes, as shown in the photographs.

Special Catalog FT tells the whole story of Austin Motor Rollers. Write for your copy today.



THE AUSTIN-WESTERN ROAD MACHINERY CO.
CHICAGO

Branches in 22 Cities
"Everything from a Drag Scraper to a Road Roller"

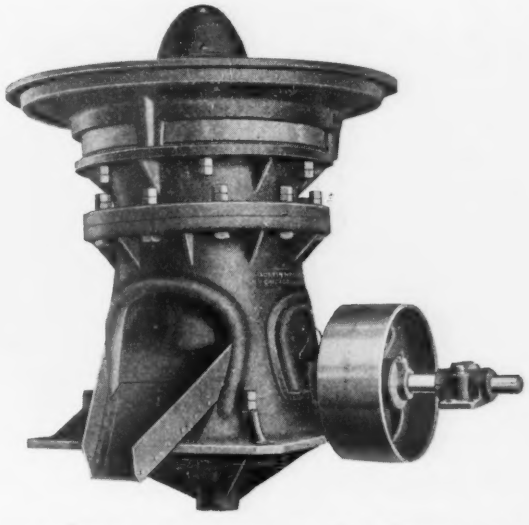
Everybody's Happy

By crushing, screening and storing rock obtained from nearby fields during the past winter, the Highways Improvement Company of South Bend, Ind., secured the material for a six-mile contract much cheaper than if they had had it shipped in, and at the same time kept their organization together and got rid of field stones and made money for the farmers in the district where the road was built.

A survey of the farms along the road was made after the contract was awarded and it was decided that enough stone could be secured from the fields to make it pay to put in a portable crushing and screening plant. The plant was set up at the middle point of the new road, and stone hauled in by farmers from within a radius of four miles.

Crushing and screening reduced the stone to four sizes, ranging from dust to 4 in. The several sizes were stored in separate piles more than 20 ft. high by means of the conveyor, so little ground space was required and the material was in shape to be reclaimed quickly when taken out for the road.

Catalog 29-T tells all about the No. 3 Austin Portable Gyratory Crushing and Screening Plant that helped to make this such a profitable venture. Write for your copy now.



AUSTIN MANUFACTURING CO.
New York Chicago San Francisco

The Type B C

"Industrial" CRAWLING Tractor Crane

is well adapted to the needs of lumber and logging companies for handling bulky materials, speedily, safely and economically.

"INDUSTRIAL" Cranes are readily convertible for various operations—pile-driving, automatic bucket operation, steam shovel work, and for handling heavy lifts with hook and block.

The Type BC "INDUSTRIAL" CRAWLING TRACTOR CRANE operated by gasoline offers many advantages. When the job is finished, shut off the throttle and all expense stops—including cost of fuel—until work starts again.

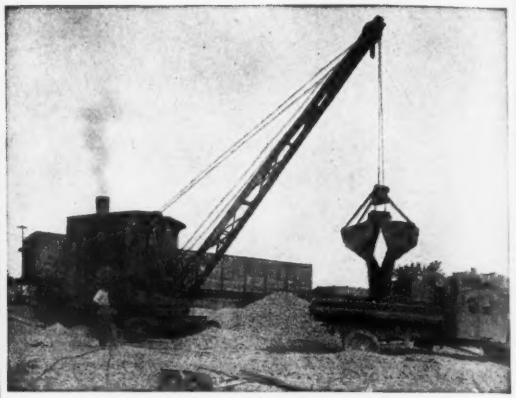
Operating independently of rails, this Crane insures maximum utilization of yard space.

The mobility of this Crane in shifting, loading and unloading cars of logs, timbers, lumber, and handling coal with grab bucket saves its cost many times over.

Perhaps an "INDUSTRIAL" could remedy your handling methods.

Catalog No. R-113 forwarded upon application

INDUSTRIAL WORKS
BAY CITY, MICHIGAN



An Honest Day's Work—

The design and construction of the O. S. Dependable Crane assures every user of an honest day's work.

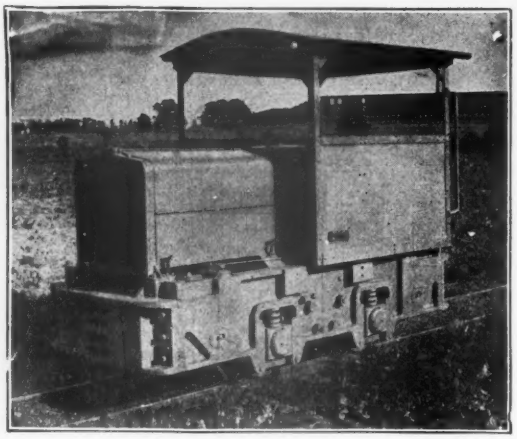
O.S.

The O. S. delivers an uninterrupted service performance that adds materially to the profits. When purchasing O. S. equipment you are also acquiring service.

Write for our catalog.

ORTON & STEINBRENNER CO.
Main Offices—Chicago, Ill.
Factory—Huntington, Ind.

WHITCOMB LOCOMOTIVES



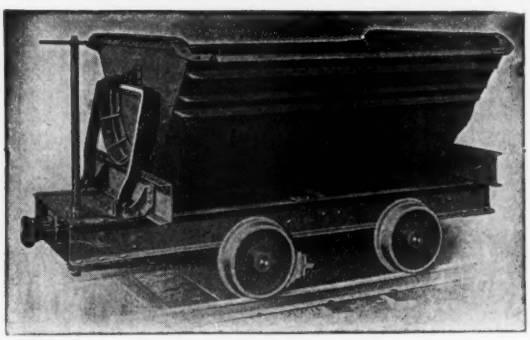
QUARRIES—CEMENT PLANTS—BRICK PLANTS

The success of Whitcomb locomotives in hundreds of plants speaks of their thoroughness of design and construction and dependability in time of need. We would be glad to tell you what they are doing for others.

Whitcomb locomotives are designed to work and built to overwork

WRITE TODAY FOR BULLETINS

GEO. D. WHITCOMB COMPANY
Rochelle, Ill., U. S. A.



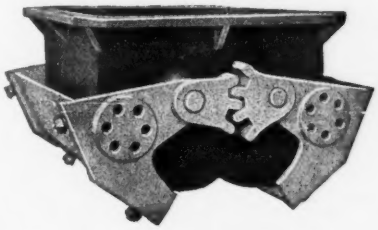
More Than Reinforced

Reinforcing a dump car makes it stronger, of course. But there is a best way to reinforce. Atlas cars are reinforced the best way. Why? Simply because we have built dump cars so long and for so many people that we know just where the reinforcing should go and just how it should be done.

Not much wonder, then, that Atlas dump cars stand the "gaff" better than the average.

The Atlas Car & Manufacturing Co.
ENGINEERS MANUFACTURERS
CLEVELAND, OHIO, U. S. A.

Robins Gates



IN ALL STANDARD SIZES

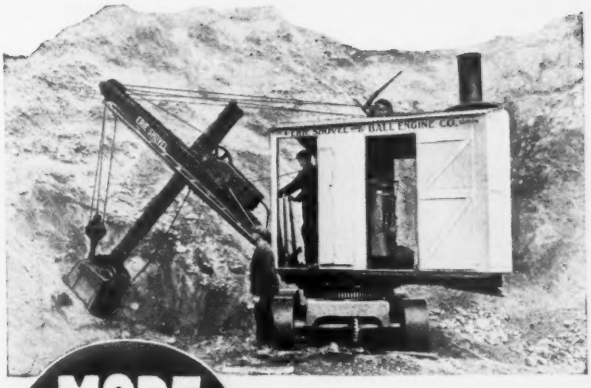
Single and Duplex Cut-off Gates Correct in Design, Rugged in Construction, and LOW IN PRICE

Single and Double Rack and Pinion Gates for every requirement

Write for prices and particulars

ROBINS CONVEYING BELT CO.

New York, Chicago, Birmingham, Boston, Denver, El Paso, Los Angeles, Philadelphia, Pittsburgh, Salt Lake City, St. Louis



MORE GRAVEL; less cost

Even the smallest ERIE often gives an output of 500 tons a day, or even more under favorable conditions.

P. Cogger, Lowell, Mass., owner of the 13-ton ERIE shown above, writes:

"I would not have believed that we could do the work that this 'A' ERIE actually handles. It has given 50 per cent more than I expected. Besides, we have dug frozen sand and rock, without a thing going wrong with the machine."

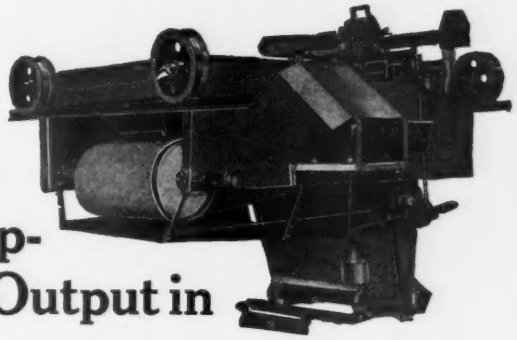
Whether you need an output of 200 tons a day or 1,000 tons, you will be interested in a bulletin that shows just what ERIE Shovels can do for you. Write for Bulletin P-16.

Branch Offices:
BOSTON NEW YORK
PHILADELPHIA
PITTSBURGH CHICAGO
Representatives throughout the U. S. A.

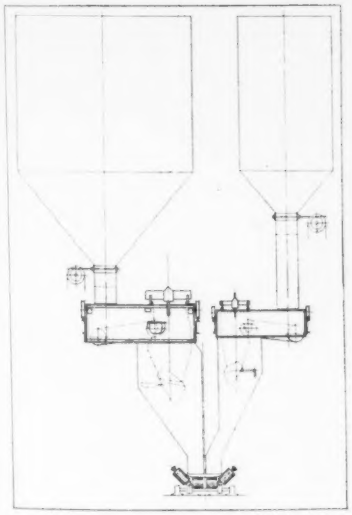
Erie Steam Shovel Co., Erie, Pa., U. S. A.
Builders of ERIE Steam Shovels and Locomotive Cranes

ERIE Revolving Shovels

Accurate and Dependable Records of Production in a Lime Plant are Essential to Better Profits



Register Your Fuel Consumption & Lime Output in

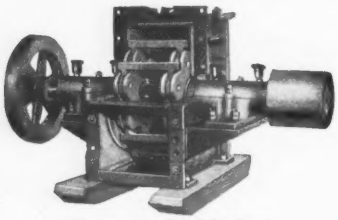


RICHARDSON

AUTOMATIC BULK SCALES

Substitute accurate, dependable knowledge for guesswork. The scales furnish a continuous check on the coal fed to boilers and kilns and register automatically your output of lime. Production checked against fuel charges will give you the control you need.

RICHARDSON SCALE COMPANY, Passaic, N. J.
New York Boston Buffalo Chicago San Francisco



Manganese Steel Linings

USERS OF

"K-B" PULVERIZERS

requiring additional tonnage are ordering "K-B" equipment.

May we tell you why?

K-B PULVERIZER

K-B Pulverizer Co., Inc.
92 Lafayette Street
New York

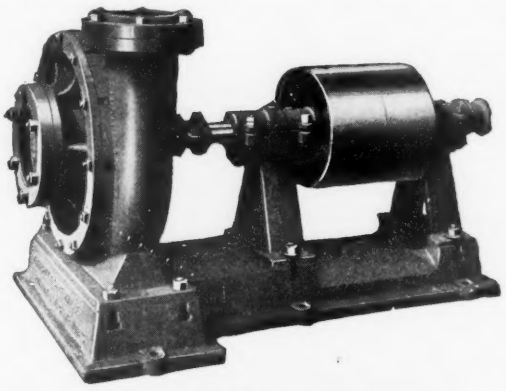
Webb City & Carterville Foundry & Machine Works

Webb City, Missouri

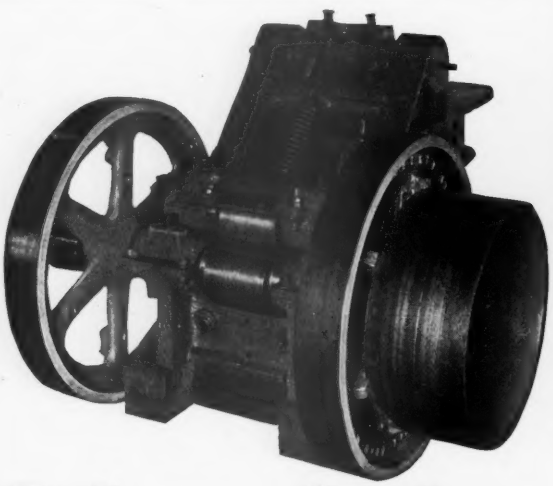
Engineers Founders Machinists

Complete Crushing Plants Designed

Manufacturers of rock crushing machinery: Jaw Crushers, Hercules-Giant and Heavy Duty Crushing Rolls, Screens, Centrifugal Pumps, Elevators, Stone Buckets, Sheet Metal Work, Stone Cars.



Write for descriptive literature



Reliance Crushers

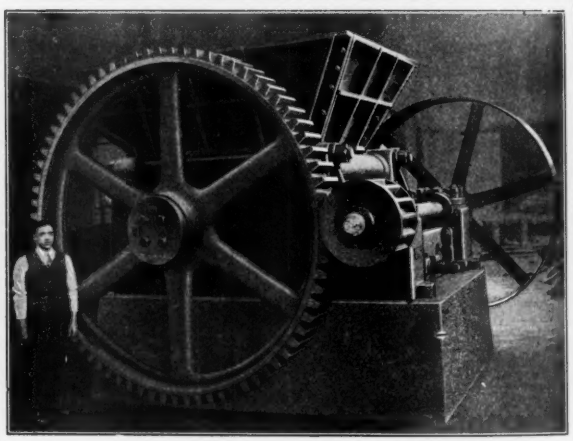
IN ALL SIZES FOR EITHER PORTABLE PLANTS FOR ROAD BUILDING OR STATIONARY QUARRY INSTALLATIONS.

BUILT FOR LONG, HARD SERVICE—WILL SAVE YOU MONEY IN THE LONG RUN

Let us quote you prices

Universal Road Machinery Co., Kingston, N. Y.

Branches in all principal cities in U. S. and Canada
MANUFACTURERS OF THE FAMOUS RELIANCE LINE OF ROAD BUILDING AND QUARRY EQUIPMENT



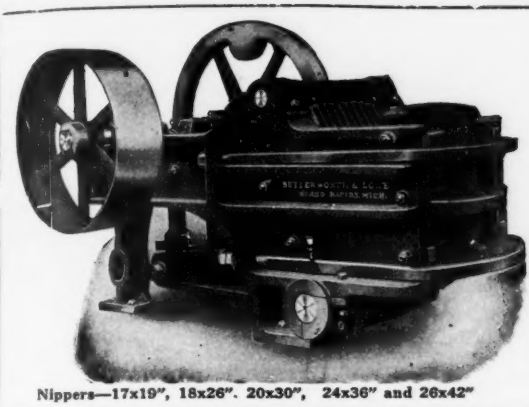
If you had seen the McLanahan Single Roll Crusher before ordering your first Gyratory or Jaw Crusher, you would now be running only the McLanahan Crushers.

After many years' practical experience building and operating other crushers, we brought out the first Single Roll Crusher, proved it best, simplest and most economical—making least fines—requires but little head room—no apron or hand feeding—takes wet or slimy material.

Capacity, 5 to 500 Tons Per Hour

McLanahan-Stone Machine Co.
Hollidaysburg, Pa.

Screens, Elevators, Conveyors, Rock Washers, Etc.



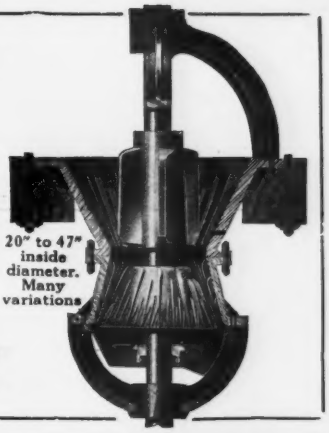
Nippers—17x19", 18x26". 20x30", 24x36" and 26x42"

JAW & ROTARY CRUSHERS

For All Rocks and Ores Softer Than Granite

GYPSUM MACHINERY—We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

Special Crusher-Grinders for Lime



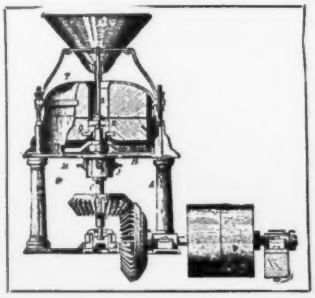
20" to 47" inside diameter. Many variations

Butterworth & Lowe

17 Huron St. Grand Rapids, Mich.

Do You Do Fine Grinding?

THE Munson Underrunner Buhr Mill has stood the test of time and is still first choice with a large number of concerns whose product demands fine, uniform grinding.



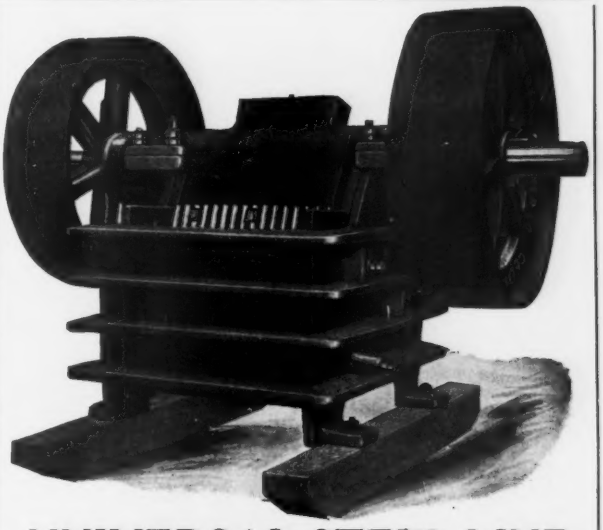
This mill is particularly well adapted for grinding limestone, gypsum, hematite ores, slate and similar materials, though in actual service it is used on a much wider variety of products.

Send us a sample of the material you wish ground so that we may tell you the possibilities of the "MUNSON."

Catalog No. 71 tells more about these mills.

Munson Mill Machinery Co., Inc.

Est. 1825 Utica, N. Y.



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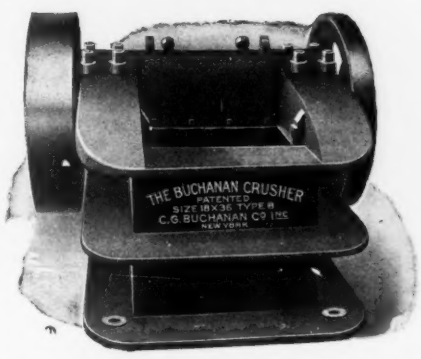
THE PERFECT GRAVEL AND REJECTION CRUSHER

Sizes up to 8"x36". Capacities 20 to 200 tons daily. Crushes to ¾" and finer if desired. Has no superior for FINE CRUSHING and UNIFORMITY of product.

STRONG LIGHT DURABLE ECONOMICAL

UNIVERSAL CRUSHER CO.

225 Third Street Cedar Rapids, Iowa, U. S. A.



BUCHANAN ALL-STEEL CRUSHER

Type "B" Jaw Crusher

Frame is a solid casting of open-hearth steel in one piece having a tensile strength of 60,000 to 65,000 lb. per square inch, three or four times stronger than cast iron and with at least three or four times the rigidity of the built-up rolled steel-plate crusher.

Jaw and Cheek Plates are of the best Manganese Steel, made reversible for double wear—Adjustable Jaw Stroke—Shim Adjustment—Safety Toggle—Reversible Steel Toggle Seats—Phosphor Bronze Frame Bearings (in smaller sizes)—Steel Swing Jaw and Pitman—Pitman water jacketed and parting in larger sizes.

Built in sizes up to 18" x 36".

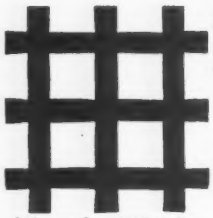
Large Crushers, Crushing Rolls, Complete Crushing Plants

Write for Bulletin No. 9

C. G. BUCHANAN COMPANY, Inc.

Cedar and West Streets, New York City

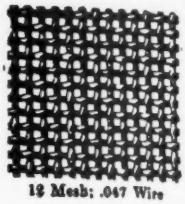
"CLEVELAND" DOUBLE CRIMPED WIRE CLOTH



2½ mesh; .105 wire

A uniform fineness is assured by the use of "Cleveland" Double Crimped Wire Cloth, making it unequalled for the screening of Sand, Gravel, Crushed Stone and Cement. "Service" is the definite policy of this organization, and through every phase of manufacture this end is constantly before us.

A large stock always on hand. However, any special mesh will be manufactured to suit requirements. PRICES RIGHT



18 Mesh; .047 Wire

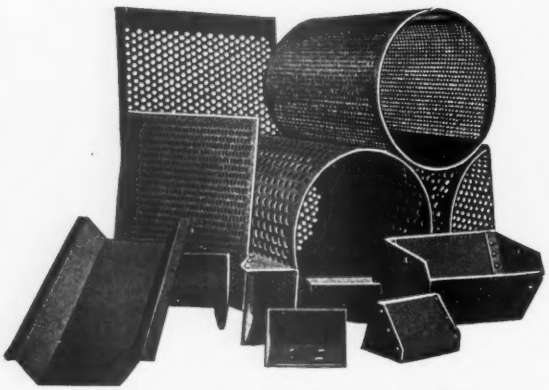
THE CLEVELAND WIRE CLOTH AND MANUFACTURING COMPANY

3573 East 78th Street Cleveland, Ohio

Perforated Metal Screens

FOR

Stone, Gravel, Sand, Etc.



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PLAIN AND PERFORATED

General Sheet and Light Structural Work

"Light and Heavy Steel Plate Construction"

HENDRICK MFG. CO.

CARBONDALE, PA.

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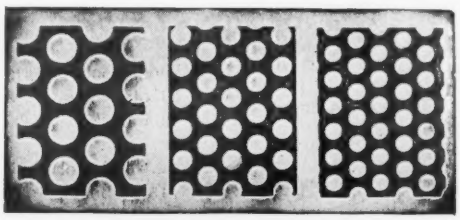
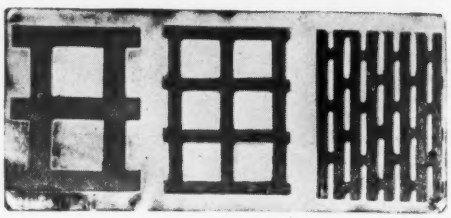
Hazleton, Pennsylvania, Office, 705 Markle Bank Bldg.

Perforated Steel Screens





For Screening Stone, Gravel, Sand and Cement

All sizes and shapes of holes in metal of proper thicknesses to give the best screening results.

Sheets furnished flat or rolled to shape for revolving screens.

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Design and build cement plants, rock crushing plants, power plants and industrial structures.

Examinations, Reports and Valuations of Industrial Properties

YORK LIME KILNS

OUR working arrangements with the foremost lime and hydrating engineer in the country, together with the practical experience and technical qualifications, enables us to make a special investigation of lime deposits, and then treat them properly in order to secure the best results.

The York Kiln makes possible a high thermal efficiency with a low fuel consumption, cutting the "per ton" cost of calcination to the minimim.

We also manufacture:

Dryers
Hydrators
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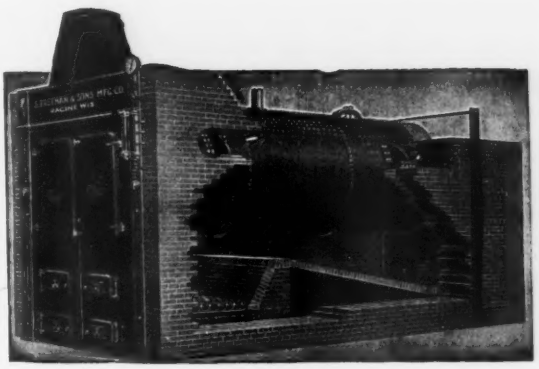
Special Machinery from Engineers' Designs

McGann Manufacturing Company, Inc.
Works, York, Pa.
332 S. Michigan Ave., Chicago 50 Church St., New York

FREEMAN
Horizontal Return Tube High Pressure Boiler



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The Kritzer Continuous Lime Hydrator

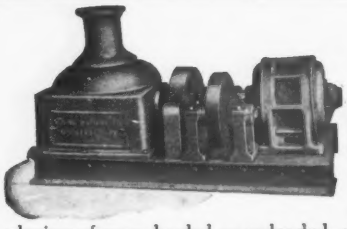
HYDRATE

Years ago we helped our customers create a demand for their hydrate. Today the demand exceeds the supply. That's why every lime manufacturer should have an efficient, economical hydrating plant.

THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

A KRITZER plant, scientifically adapted to your conditions, will give you the best product at lowest cost

THE KRITZER COMPANY
503 South Jefferson Street CHICAGO, ILL.



The "HANDY MAN" Car Puller

This car puller equipment will give you absolute control in the spotting or replacing of cars, loaded or unloaded, and without regard for weather conditions. It will pull cars from either direction, is exceptionally compact and rugged in construction, can be installed in a limited space, and motor is protected by metal cover.

Furnished in type and size to meet your special needs—Motor or Belt drive. The "Handy Man" is a real money saver.

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MORSE SILENT CHAIN DRIVES

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Morse Chain Drives

A POWER SAVER FOR POWER USERS

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HIGH SPEED SILENT RUNNING FLEXIBLE GEARING FOR POWER TRANSMISSION

Address Nearest Office

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This organization designs and builds Lime and Hydrated Lime, Cement and Plaster plants after making a scientific study of each proposition.

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New Holland Revolving Screens

made in three different sizes and four different lengths — capacity from one to two hundred tons per hour.

Write for catalog and prices on revolving screens, jolt screens, elevators, conveyors, and primary or secondary rock crushers.

NEW HOLLAND MACHINE COMPANY

New Holland, Pa., U. S. A.

We Look Into the Earth

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all minerals.

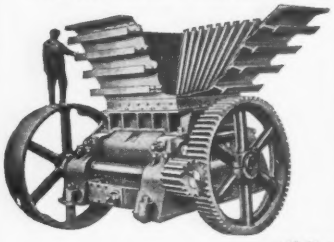
We are fully equipped for testing foundations for bridges, dams, buildings, and all work of a similar character.

PENNSYLVANIA DRILLING CO.

Drilling Contractors

Pittsburgh, Pa.

"PENNSYLVANIA" Single Roll Crusher



The New Series of "Pennsylvania" Single Roll Crushers take steam-shovel feed of limestone, cement rock, gypsum and similar materials, — wet and sticky, — without feeder, and make maximum reduction in one operation. All parts readily accessible. Maintenance cost lower per ton than for any other type. Massive construction — Reliable Safety Devices — Convenient adjustment. Capacities 5 to 450 tons hourly.

Put Your Reduction Problems Up to Us

PENNSYLVANIA CRUSHER COMPANY

Stephen Girard Bldg., Philadelphia

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REPEAT orders indicate satisfied customers. That's why we are proud of the fact that a large percentage of our sales are to people who are already operating Sauerman Cableways. One large sand and gravel company has seven of our machines installed at their different plants. If you wish to know why our equipment is so popular, send for Pamphlet No. 17.

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430 South Clinton Street Chicago

SAUERMAN DRAGLINE CABLEWAY EXCAVATORS

dig, convey, elevate and dump in one operation

METRO NITE

for Stucco

Metro-Nite White is a siliceous dolomite, extremely hard, sharp, cleanly graded and makes a bright, sparkling face for stucco buildings, concrete bricks or blocks.

It is generally accepted as the most beautiful and artistic facing known for this purpose, and we will gladly send samples to anyone who is interested in carload lots.

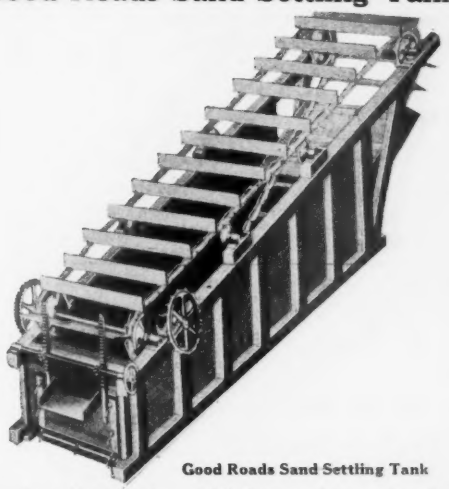
Metro-Nite can be delivered either in white or green.

THE METRO-NITE CO.
333 Hartford Ave., Milwaukee, Wis.

The Sand That's In Demand

is clean sand—the kind that's washed—the kind that's produced with a

Good Roads Sand Settling Tank



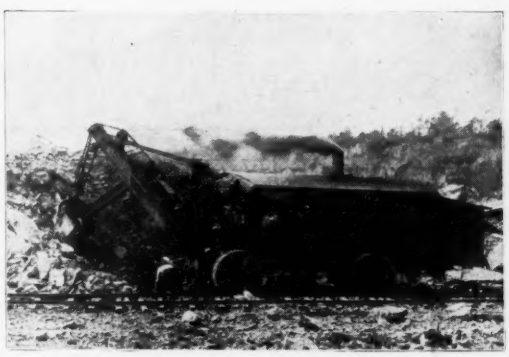
Good Roads Sand Settling Tank

Our business is to design and build complete sand and gravel washing and screening plants—the kind that give satisfaction and profit to the user.

If you expect to change or enlarge your present plant, or equip a new plant, we would like to confer with you. Our advice will cost you nothing.

Ask for catalogue No. 5A. It is an informing book for sand and gravel producers

THE GOOD ROADS MACHINERY CO., INC.
1203 Tower Building, Chicago, Ill. **Kennett Square, Pa.**



Osgood 43—1½ yd. on Traction Trucks

OSGOOD

THE GOOD STEAM SHOVEL

for Pit or Quarry use—where a machine must stand up under the most severe usage—and still produce results quickly and economically. Watch an Osgood work. Note its speed and snappy action. Our Bulletins sent upon request.

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BELT FASTENERS

A powerful, won't-let-go grip that means economy in time and production. A joining that is permanent for the life of the belt—which saves the belt and makes it last longer. Nothing cut out but trouble, delay and expense.

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CRESCENT BELT FASTENER CO.
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The Morgan Producer Gas Machine

is the highest class gas producer built in the U. S. and is advertised in this journal the second issue of each month.

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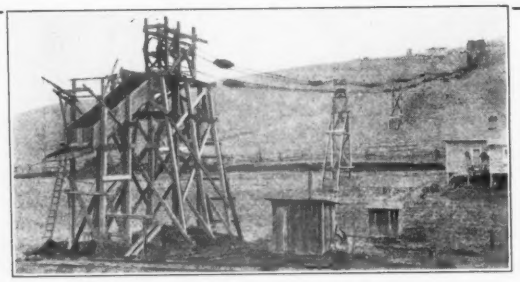
BALDWIN
Industrial and Contractors' LOCOMOTIVES

are in use where dependable motive power is required.

Full information upon request

The Baldwin Locomotive Works
PHILADELPHIA



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No, ahead to simplicity and directness in operation and production. Why make haulage a problem? Let it be an asset through use of an AUTOMATIC AERIAL TRAMWAY.

Write for Details

Interstate Equipment Corporation 25 Church St. New York City

Quality and Service Always—

We manufacture screens in any desired wire material, in any style, or size of mesh. Uniform Double Crimped sand and gravel screens. Heavy screens for crushed stone. A large stock of galvanized wire cloth and fine mesh in either steel, copper or brass always on hand. "Everwearing" spring steel screens are practically indestructible.

Send for circular—prices always right

TWIN CITY IRON AND WIRE COMPANY
St. Paul, Minn.

THE McMYLER

THERE is power built into each machine, a ruggedness that can be depended on to stretch out into months and years of flawless service.

Try out the Type "J" Locomotive Crane and its operation will convince

THE McMYLER INTERSTATE CO.
Cleveland, Ohio

BRANCH OFFICES:

New York City, 1756 Hudson Terminal Building
Chicago, Ill., Railway Ex. Bldg.
Seattle, Wash., Hoge Building
Denver, Colo., 18th and Wazee Streets
New Orleans, La., 444 Maison Blanche Annex
Birmingham, Ala., Brown-Marx Building
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EMERSON STEAM PUMPS

Quarry and mine operators have found EMERSON pulsating steam pumps stand the test of hard service. In use more than twenty years. Sturdy and strong, easy to move around, performance is positive, priced right. IMMEDIATE DELIVERIES.

EMERSON Foot Valves add efficiency to any pump.

Write for complete information

The Emerson Pump and Valve Co., Inc.
Alexandria, Va.

When in the market for machinery or equipment, look through the advertisements of ROCK PRODUCTS. If you do not find what you want advertised in this issue, write us and we will put you in touch with reliable firms who can supply your need. This service is free to our readers. Use it.

Rock Products

The Nation's Business Magazine of the Rock Products Industry

542 So. Dearborn St. Chicago, Illinois

Drive Your Crane to Work!

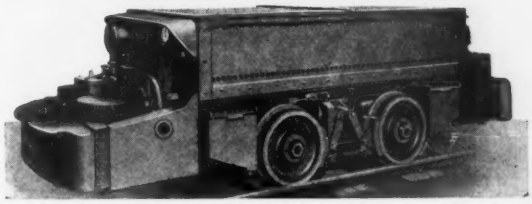
The Byers "Truckrane" can be driven to work just like any automobile. Saves time and expense on every job. One owner recently refused $50.00 rental per day for a two weeks job in Chicago. Ask for "Truckrane" Bulletin.

THE BYERS MACHINE COMPANY
310 Sycamore Street, Ravenna, Ohio
Builders of Full Circle Cranes, "Auto-Cranes," Buckets, Hoists, etc.

THE IRONTON
STORAGE BATTERY LOCOMOTIVE

Efficient, economical hauling. Find out about storage battery locomotives for your hauling. The Ironton is the best storage battery locomotive.

The Ironton Engine Co.
Ironton, Ohio



The HOAR Underground Shovel

Our engineering staff will make a guaranteed performance that this machine will lower costs and increase production.

THE HOAR SHOVEL COMPANY
214 Sellwood Building
Duluth, Minn.

Robert W. Hunt Jno. J. Cone D. W. McNaugher

ROBERT W. HUNT & CO.

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Inspection New and Second Hand Machinery, Pumps, Crushers, Steam Shovels, Cars, Locomotives, Rails and Quarry and Contractors' Equipment

INSPECTION AND TESTS OF SAND, GRAVEL, CEMENT, STRUCTURAL STEEL, CASTINGS AND CONSTRUCTION MATERIALS

Cement, Chemical and Physical Testing Laboratories

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2200 Insurance Exchange

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St. Louis Kansas City Cincinnati San Francisco

FULLER PRODUCTS

Insure Fullest Satisfaction

Crushing Rolls.
Pulverizer Mills.
Direct and Indirect Fired Dryers.
Ball and Tube Mill Liners and Partition Plates.
Fuller-Kinyon System for Conveying Pulverized Materials.
Sprockets, Traction Wheels, and Roll Heads.
All kinds of High Grade Chilled Charcoal Iron Castings for All Uses.

Ask for catalogue and prices

FULLER-LEHIGH COMPANY
Fullerton, Pa., U. S. A.

CROSS ENGINEERING CO. CARBONDALE, PA. PERFORATED SHEET METALS

Our screens produce a product clean and perfectly sized.

We can supply repair and renewal parts quickly and correctly. Rush orders can be filled promptly because of our stock of 500 tons or more of steel plates.

Cross Engineering Company
Offices and Works:
Carbondale, Pa.

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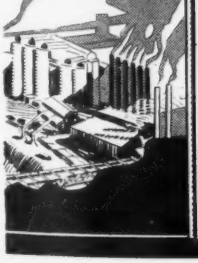
PREVENTS HEAT PENETRATION



Heat Insulation

for Cement Kilns and Waste Heat Boilers

Sil-O-Cel Insulation possesses a lower heat conductivity than any other known material and will withstand extremely high temperatures. Furnished in convenient forms for easy application.

Detailed information and blueprints sent upon request. Write for Bulletin S-95.

CELITE PRODUCTS COMPANY
New York-11 Broadway Chicago-35 W. Jackson Blvd. San Francisco-Monadnock Bldg.
CELITE PRODUCTS LIMITED, New Birks Bldg., Montreal, Canada
OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

ANCHOR BRAND COLORS

For Mortar, Cement and Brick—Brown, Black, Red and Buff —Strongest and Most Durable

Manufactured by

C. K. Williams & Co.

Correspondence Solicited EASTON, PA., U. S. A.

Used Equipment

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Type ads only. No cuts or illustrations permitted unless at the regular display advertising rates. Please send check with order. These ads must be paid for in advance of insertion

IMMEDIATE SHIPMENT

2—Austin No. 3 Gyratory Crushers.
2—Bonnot 5′x22′ Compeb (tube) Mills.
1—Vulcan 8′x100′ Rotary Kiln.
1—Vulcan 7′x120′ Rotary Kiln.
1—Renneberg 5½′x45′ Ore Dryer.
4—American Process 4′x30′ Rotary Dryers.
2—Hardinge 8′ Conical Mills.
1—Link Belt 20-Ton Hourly Coal Crusher.
Raymond, Kent and Fuller Mills.
Swing Hammer Mills, all makes.
Buchanan and Sturtevant Crushing Rolls.
Jaw, Gyratory and Disc Crushers.
Complete Experimental Cement Plant.

High Grade Used Machinery for the Entire Rock Products and Non-Metallic Mineral Industry Our Specialty

American Machinery Equipment Co., P. O. Box No. 292, Charlotte, N. C.

Released Stone Crushing Equipment

No. 7½ K Allis Chalmers Gyratory Crusher. Straight Drive Shop No. 5367. Some $2000 worth of extra parts, including head and shaft, eccentric and gear, bushings, etc. All in good working order. Can ship immediately.

No. 4 Austin Gyratory Crusher. Straight drive. Extra eccentric, gear and other parts. Smooth head for fine crushing.

General Electric D. C. Generator. 2500 watts, 125 volts, belt drive. Suitable for lighting plant or driving small shop motor.

Cletrac Caterpillar Tractor. Shop No. 23644. Only used three months, but needs some repairs. Will sell at a bargain price.

Several small Steam Piston Pumps.
Some 6 H.P. to 10 H.P. Gasoline Engines.

A 10-ton Road Roller.

LEHIGH STONE COMPANY
Box 515 Kankakee, Illinois

WANTED

Air separator 18′, prefer Gayco. Advise present condition, location, price, etc. Also one belt or chain elevator, 75 to 80 ft. centers, with about not less than 7 x 14 buckets complete. Address

Box 1631, Care of Rock Products
542 So. Dearborn St.
Chicago, Ill.

For Sale—STEAM SHOVEL

⅝ YD. THEW "O" TRACTION

Thoroughly rebuilt; attractive terms for quick sale.

Walter A. Zelnicker Supply Co., St. Louis
Rails, Locomotives, Cars, Tanks, Pipe

Machinery For Sale

DRYERS—Direct-heat rotary dryers, 3x25′, 3½x25′, 4x30′, 5½x50′, 6x60′ and 7x60′; double shell dryers, 4x20′, 5x30′ and 6x35′; steam-heated air rotary dryers, 4x30′ and 6x30′.

KILNS—Rotary kilns, 4x40′, 5x50′ and 6x70′, 6x100′, 7x80′ and 8x110′.

MILLS—6x8′, 6x5′, 5x4′, 3x3½′ pebble and ball mills; 3′ March mill; 42″, 33″ and 24″ Fuller-Lehigh mills; 4½x20′, 5x11′, 5x20′, 5½x22′ and 6x20′ tube mills; 7½x13″, 9x15″, 16x10″ and 12x26″ jaw crushers; one "Infant" No. 00, No. 0, No. 2, No. 3, and No. 9 Williams' swing hammer mills; one Kent type "G" mill; 24″, 36″ and 40″ cage mills; 3′ and 4½′, 6′ and 8′ Hardinge mills; 18x12″, 20x12″ and 30x10″ roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; 5 roll and 2 roll No. 1 and No. 000, No. 00 and No. 0 Raymond mills; one No. 3 and No. 4 and No. 7½ Telsmith breaker; one 36″ Sturtevant emery mill; one 3 roll Griffin mill; 60″ chaser mill.

SPECIALS—Five automatic package weighing machines; jigs; 6x8′, 6x5′ and 4x3′ Newaygo vibrating screens; Richardson automatic scales; 8′ and 10′ Emerick air separators.

Air compressors.

W. P. Heineken, Engineer
95 Liberty Street, New York. Tel. Cortland 1841

Special Bargains

Send Us Your Boiler Inquiries

66x86 in. TRAYLOR JAW CRUSHER
25-50-80-110 H.P. Elec. Hoists
Nos. 4-5-6-7½-9 and 10 CRUSHERS
6 and 12-ton Gasoline Locomotives
2-DISC CRUSHERS, 36-in. SYMONS
100-TON, 2½-YD. ELECTRIC SHOVEL
50-5000 ft. Steam Belt and Electric Compressors
13x30 in.; 10x18 in.; 8x14 in. JAW CRUSHERS
24x54 McLANAHAN ROLL CRUSHER
50 H.P. P. D. D. HOIST, 440-v. 3-ph. Motor-Dragline Set; also 25 H.P. Outfit
NEW G. E. Gas Engine Sets, 5-25 Kw.; 125-v.
NEW 1000 Gpm. Cent. Pump, 231 ft. head—"STANDARD UNDERWRITERS"—Motor 440-v.; 60 cy. 3-ph.
2—1000 Gpm. Underwriters Steam Pumps, 100 lb.

Send us inquiries for your wants

Ross Power Equipment Co.
Indianapolis, Ind.

WANTED

Three (3) Raymond Mills

Address Box 1637, care of Rock Products
542 South Dearborn St., Chicago, Illinois

FOR SALE

Two boom cargo unloader. This unloader could be suitably used in storing and handling coal, sand or gravel, and we can offer it at a great bargain.

Pittsburgh Machinery & Equipment Co.
1302 Fulton Building
Pittsburgh, Pa.

FOR SALE

BARGAIN

Emerson, Brantingham Hoists

UNUSED

DOUBLE CYLINDER, SINGLE DRUM, IN FIRST CONDITION

$150.00 Each F.O.B. Chicago

Capacity 10,000 Pounds

IMMEDIATE SHIPMENT

Detailed Specifications Furnished on Application

"QUANTITY IS LIMITED"

Hyman-Michaels Co.
531 Peoples Gas Bldg., Chicago, Ill.

FOR SALE

No. 3 Austin Gyratory Crusher complete.
2 No. 2 Climax 9″x16″ Jaw Crushers complete.
1800 ft. No. 4 d.b. and w.p. electric wire.
50′ Cont. bucket and chain elevator, buckets 8″x16″.
75 H.P. 13″x16″ side crank Erie City Steam Engine.
9″x14″ Vulcan Locomotive No. 981 complete.
2 G.E. 150 H.P. Induction Motors, voltage 220-440, shop numbers 625140 and 1164925—complete with starters.
Williams No. 9 Universal type swing hammer pulverizer complete.
Kent three-roller pulverizer.
10″x8″x20″ Worthington St'm Pump No. 16876.
Sanderson Cyclone No. 14 well drill, either electric or gasoline driven, complete.
Austin Standard Revolving Screen 40″ diam. by 20′ long, complete.
Williams No. 2 Pulverizer.
No. 1 Sturtevant Open Door Crusher.

E. W. COOPER, Engineer
174 3rd Ave. North Nashville, Tenn.

FOR SALE

One W. S. Tyler Co. Hummer Electric Screen with four sets wire in frames and suitable for sand screening. This machine is practically new, used but one month. For particulars address

Box 1635, care of Rock Products
542 South Dearborn Street Chicago, Illinois

Used Equipment

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Wanted—Used Equipment

Two 6′ 2 or 3-surface, Hummer Vibrator Screens, with or without screw feed. Might consider mechanical vibrator.

1 Horizontal tubular boiler complete with trimmings without stack. 80 b. h. p. Prssure 100 lbs. inch.

1 Steam Shovel, ½ cu. yd. full revolving, half or full caterpillar, possibly consider 1 steam or gasoline power crane with ½ to ¾ clamshell bucket same traction.

Eau Claire Sand & Gravel Co.
Eau Claire, Wis.

1—50-ton Standard Gauge Baldwin 6-wheel switcher, built 1911.

1—42-ton standard-gauge Shay geared locomotive.

1—12x18 in. standard-gauge 4-wheel saddle tank.

10—5-ton 36 in. gauge storage battery locomotives.

1—14-B Bucyrus steam shovel, mounted on traction wheels.

2—18-ton O & S bucket handling locomotive cranes.

30—Miles 56-lb. relay steel rails; Hawkinsville, Ga.

30—Miles 50-lb. and 56-lb. relay steel rails; Percy and Webb, Miss.

Birmingham Rail & Locomotive Co.
Birmingham, Alabama

CRUSHER PLANT

24x36 Buchanan Jaw Crusher, and 48 in. Symons Disc Crusher, with elevators, screens, line shafting. In Oklahoma.

Dump Cars

9—1 yd. 30 in. Ga. V-shape
6—1½ yd. 24 in. Ga. Western
12—4 yd. 36 in. Ga. Western

Rails

230 tons 25 lb. Relayers
180 tons 30 lb. Relayers
165 tons 35 lb. Relayers
Also 60, 70, 75 and 80 lb. Rails

Mid-Continent Equipment & Machinery Company
Security Bldg. St. Louis, Mo.

SIX BBLS. AUTOMOBILE GREASE

Suitable for any purpose. $25.00 per bbl. or $100.00 for lot, f.o.b. cars.

J. F. MEIGHAN
P. O. Box 233, White Plains, N. Y.

FOR SALE

2—8x110′ Rotary Kilns.
5—5x6x7x110′ Rotary Kilns.
5—5x21′ Tube Mills (1 has Silax lining, 3 steel lining, 1 without lining).
1—4′ 6″x29′ Coal Dryer.
2—No. 6 Gates Crushers.
3—5½x22′ Tube Mills.
2—6x50′ Rotary Dryers.
3—Kominuters.
6—Krupp Ball Mills.
3—33″ Fuller Mills.
2—6x60′ Rotary Dryers.

ENGINEERING SALES COMPANY, Nashville, Tenn.
OLLIE LAWRENCE, Stockertown, Pa.

Cement Mill Machinery For Sale

1—New 6′ diameter x 22′ long Bonnot Tube Mill, complete without drive pulley and with or without liners. Machine has water cooled bearing and is belt driven. Location—Bettsville, Ohio.

1—Used 6′ diameter x 22′ long Bonnot Tube Mill, complete with drive pulley, liners, pebbles, etc. In first-class condition. Location—Bainbridge, Pa.

1—Used 8′ diameter x 6′ long Kennedy Van Saun Ball Mill complete with drive pulley, liners, balls, etc. In good condition. Location—Bettsville, Ohio.

1—Used 8′ diameter x 22′ long dry grinding Kennedy Van Saun Combination Mill, complete with pulley, liners, balls, etc. In first-class condition. Location—Bettsville, Ohio.

1—Used 8′ diameter x 6′ long Allis-Chalmers Ball Mill, complete with pulley, liners, etc. In first-class condition. Location—Bainbridge, Pa.

1—Used 8′ diameter x 6′ long Kennedy Van Saun Ball Mill, complete with pulley, liners, etc., but without discharge head. In fair condition but requiring a new head. Location—Bainbridge, Pa.

A large stock of repair parts for all mills.

34 new unpunched tank steel plates, 280″x96″x 9/16″ thick. Total weight 154,424 lbs. Just sufficient to roll two 7x110′ Rotary Kilns, including butt straps.

KENNEDY REFRACTORIES CO.
Tiffin, Ohio

DREDGE FOR SALE

Fully equipped steam suction dredge ready for immediate service.

8-in. Morris direct connected pump.

Dull inclined conical screens.

Separate sand sluice so that straight sand can be pumped without elevating to sand and gravel separating rig.

Hull built of full length Oregon fir.

H. H. Halliday Sand Co.
Cairo, Ill.

IMMEDIATE DELIVERY

1—7 ½x13-in. Champion Jaw Crusher; excellent condition ---------- $300.00
7—1¼ yd. end dump wood quarry cars, 30-in. gauge ---------- 85.00
Trucks alone worth this money
1—12x16-in. Chandler Taylor Steam Engine, side crank left hand, self contained, slide valve; 17x72-in. band flywheel, shop No. 6070; excellent condition ---------- 350.00

CERULEAN STONE COMPANY
Cerulean, Trigg County, Ky.

Special Bargains in BRAND NEW EQUIPMENT

Located at South Jacksonville, Florida

10—12 x 18 x 24 National Transit Duplex Steam Pumps, Brass Fitted.

6—10 x 12 x 12 National Transit Duplex Steam Pumps, Brass Fitted.

6—10 x 9 x 12 National Transit Duplex Steam Pumps, Brass Fitted.

19—7½ in. x 10 in. Reversible Steam Winches.

3—Heavy Steam Windlasses.

6—81 in. Blowers, each direct connected to 7 x 5 Steam Engine.

7—No. 40 Keeth Fans, each direct connected to 5 x 4 Steam Engine.

2—10 ton Hydraulic Lifting Cranes.

5—"Radojet" Condensate Pumps, each direct connected to 5 hp. Steam Turbine.

1—Wheland Portable Saw Mill, Drag Saw 31 in. stroke, 52 ft. carriage, all complete except the Log Jacker.

1—Lot of Fuel Oil Burning Equipment, consisting of Oil Heaters, Traps, Burners, Thermometers, Strainers and various other parts.

15—International Time Recorders, with Card Racks.

In addition to the above new equipment we also offer a lot of new supplies such as Manila Rope, Bolts, Rivets, Studs, Electrical Supplies and Pneumatic Tools.

Address our Sales Office at Box 572 So. Jacksonville, Florida, or

MACHINERY & SUPPLY CORPORATION
Joplin, Missouri

WANTED

1 42" Fuller Mill, Fan Discharge for pulverizing coal.

Indiana Portland Cement Co.
Greencastle, Indiana

For Sale

10-ton American Locomotive, 36-in. Gauge
3—4 yd. 2-way Dump Cars, 36-in. Gauge
15 H.P. Fairbanks Gasoline Engine.....$100
13x34 Brown Corliss Engine..... 300
14x36 Putnam Engine..... 360
15x36 Putnam Engine..... 390

Atlas Co., Mertztown, Pa.

For Sale

Electric Motor, Allis-Chalmers 200 h. p., 2200 volt, 514 r. p. m. Synchronous speed, 3 phase 60 cycle.

Will make an attractive price on this motor which cost over $2,700; never been used.

Address Box 1639, care of Rock Products,
542 South Dearborn Street Chicago, Illinois

Mine Cars, Rails and Ties

We have mine cars in stock for all purposes. Also rails 12 lb. to 100 lb. section. Spikes, bolts, frogs and switches. All trade is solicited and prices cheerfully quoted.

M. K. FRANK
Frick Building Pittsburgh, Pa.

For Sale

1 Williams Porto Crane, Steam 7x10 engine, traction wheels, 30 ft. boom, ⅝ cubic yard bucket. Used two years. In excellent condition.

Eau Claire Sand & Gravel Co.
Eau Claire, Wis.

WANTED

Second-hand Krupp Tube Mill, in good condition, size 6x16.

Security Cement & Lime Company
Hagerstown, Maryland

Classified Advertising

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Type ads only. No cuts or illustrations permitted unless at the regular display advertising rates. Please send check with order. These ads must be paid for in advance of insertion

For Sale or Lease

200 yard capacity, well-equipped limestone quarry in Iowa. Present owners are not quarry men and will sell to right party on easy terms. Will also buy the output. Address

Box 1641, care of Rock Products
542 S. Dearborn St., Chicago, Ill.

FOR SALE

Quarry of 5 acres, located in city of St. Louis, plant in operation, pit 350x180 feet, face 60 feet in height; no limit to depth of stone. Within 60 feet of public railroad switch, and the largest steel mills in state. This city on February 9 voted a bond issue of $87,372,500 for public improvements. Building permits for month of February show increase of more than $1,000,000 over February, 1922. This is a chance of a life time. Address

Box 1642, care of Rock Products
542 South Dearborn St., Chicago, Illinois

Position Wanted

First class executive with thorough practical knowledge of the erection and operation of crushing and lime plants, is open for position as manager or superintendent, taking full charge. Now employed but desires change. Location anywhere. Excellent references.

Address Box 1636, care of Rock Products,
542 South Dearborn Street Chicago, Illinois

WANTED

Experienced operator for Sauerman Cableway Thomas Electric Hoist. Must be capable of keeping machinery in tip-top shape. Have steady position for a good steady operator. State age, experience, and salary expected in first letter, and must be ready to come by March first. References.

J. E. IRVINE, Green River, Wyo.

For Sale or Lease

Good Washed River Sand is gold in Southern Minnesota

Good washed river sand and gravel is priceless owing to the demand in Southern Minnesota and the territory surrounding. We own 1800 feet frontage on the Minnesota River, 500 ft. from the main line of the "Omaha" R. R. from the Twin Cities to Omaha, Neb., within the city limits of St. Peter, 100 ft. from a 2200 voltage wire. St. Peter is 12 miles from Mankato and 76 miles southwest from Twin Cities, on the main line of "Omaha" R. R. We have an inexhaustible supply of sand in Minnesota River. Sand washes in as fast as taken out and demand greater than the supply at this time. An ideal location for sand dip or sand sucker. Have other interests, cannot handle. Will sell outright or lease on royalty basis. Write

St. Peter Tile Works, St. Peter, Minn.

H. E. WIEDEMANN

(Est. 1905)

Consulting and Analytical Chemist

Specialist in Analysis of Rock Products

Chemical Bldg. St. Louis

POSITION WANTED

As superintendent of large quarry or lime operation. 15 years' experience. Competent to handle large body of men. Understand steam shovels, dinkey engines, crushing machinery and well drilling. Specialized 10 years in burning and preparing Dolomite for open hearth furnaces, with both rotary and vertical kilns. Married. References.

Address Box 1638, care of Rock Products
542 South Dearborn Street Chicago, Illinois

WANTED

Reliable, experienced crusher and quarry man, to manage plant, with small amount of capital to invest, or one capable of engineering and organizing a company. Unlimited amount of high-grade limestone and blue plastic fireclay. Good prices, excellent demand, and growing. Closest competition $1 freight rate. Great opportunity for an experienced business man. Address

M. T. KIGGINS, Hillsboro, Ill.

Talc Mines and Mill

For sale or lease, unusual opportunity for an investor; investigation and inspection invited; 460 acres mineral rights, 560 acres. N. Y. owners cannot devote time; fully equipped, for day, night operation. Fine talc deposits; suitable, sawing, grinding, large warehouse and office, at R. R.; located north Georgia. Address

Box 1617, care of Rock Products
542 South Dearborn Street Chicago, Illinois

PUBLIC SALE

of the Denver Limestone Co.'s

QUARRY, PROPERTY, AND EQUIPMENT

At Denver, Pa., Saturday, March 31, 1923, at 10 a. m., on the premises of the company, Quarry consisting of 11 acres with a 75-ft. x 100-ft. open dry face, Crushing and Screening Plant, capacity of 300 tons per day, bin, siding, scales, compressor, dwelling house, stable, blacksmith shop and other necessary equipment.

WANTED

A position as superintendent of a sand and gravel plant, 25 years' experience as steam and electric engineer, 6 years as builder and superintendent of sand and gravel pumping plants. Now employed as chief engineer in large factory.

Address R. H. C., care of Rock Products
542 South Dearborn Street Chicago, Illinois

Gypsum For Sale

I have two million (2,000,000) tons pure gypsum and gypsite for sale close to the Frisco R. R. in Oklahoma. Write for particulars.

H. E. WILSON
Box 307, Fairfax, Okla.

For Sale or Lease

Ballast and road stone quarry on Pennsylvania Railroad, midway between Harrisburg and Lancaster, Penna. Well developed. Large acreage. For complete information address

Kennedy Refractories Co. Tiffin, Ohio

George Borrowman, Ph.D.

CHEMIST

Analyses, consultations, researches in connection with rock products, cements, clays, lime, plasters, zeolites, sands, etc.

9 So. Clinton St. Chicago, Ill.

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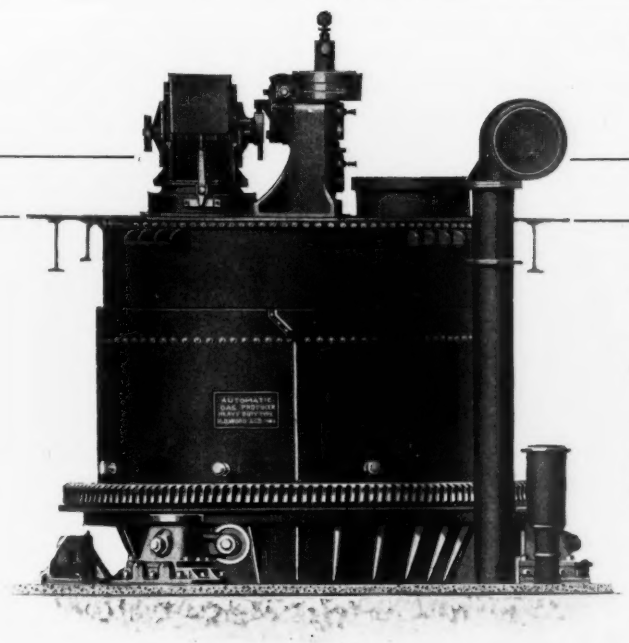

WOOD AUTOMATIC GAS PRODUCERS

What do you expect?

What do you expect of your gas producers?

Isn't it worth your while to investigate a make that will undoubtedly give you more for your investment than you are getting?

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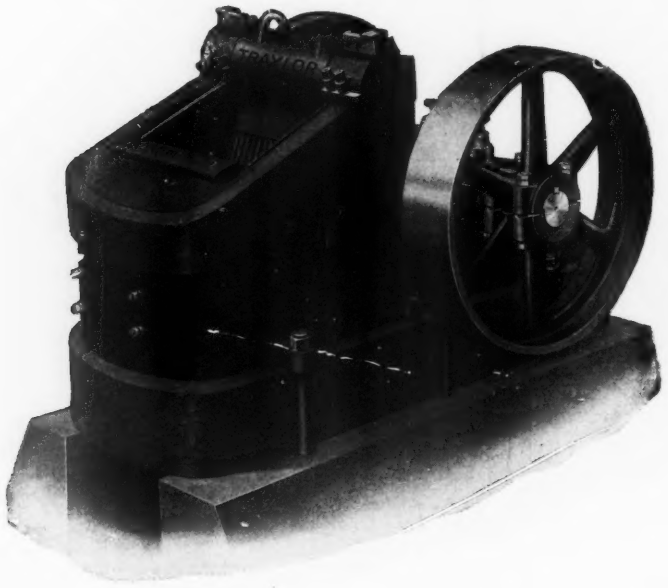

OUTSIDE and INSIDE

OBSERVE these two photographs — above, note the sturdy strength—the veritable "bulldog" aspect of this master crusher —ready for any duty however severe — and equal to it, too!

TO the left, note the simplicity of the "innards" of the brute and yet the impression of latent power—above all, observe that every part is readily accessible and therefore easily watched during operation.

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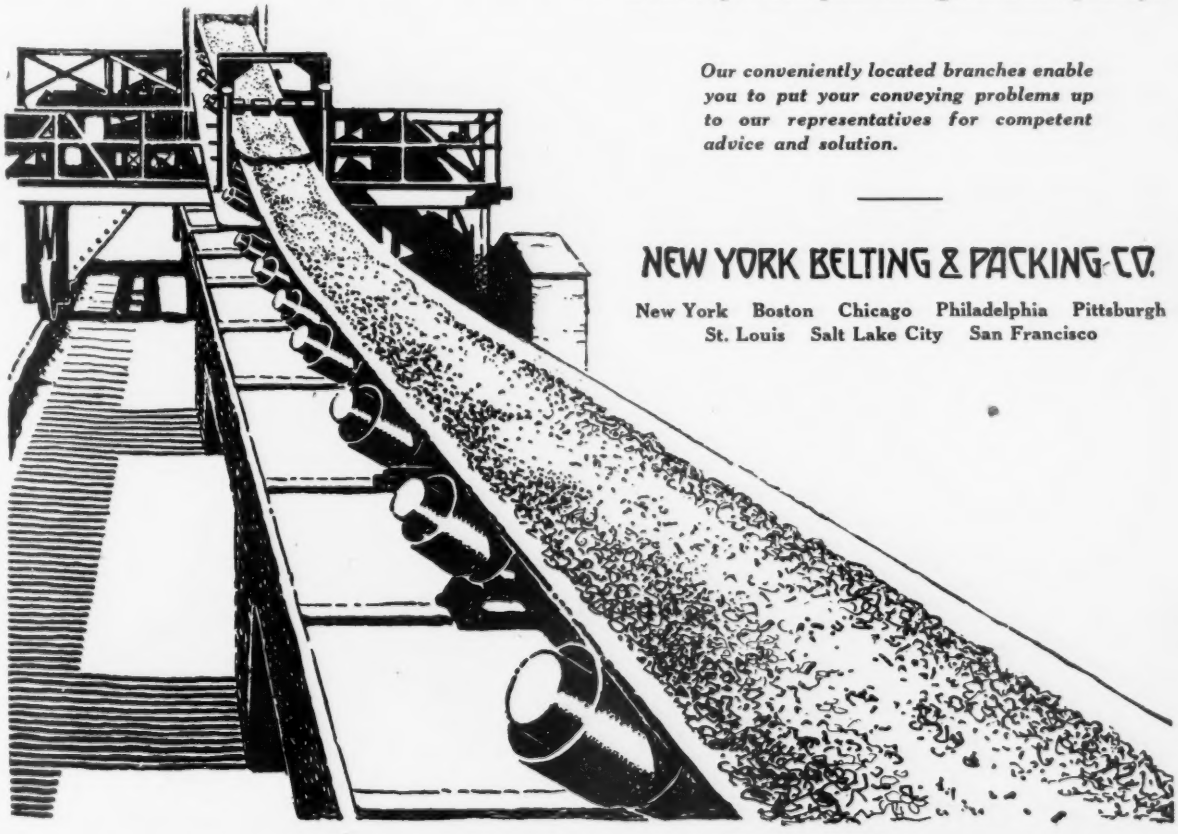

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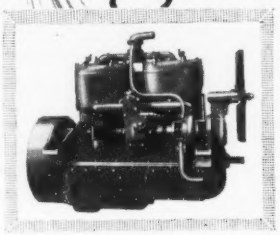

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More power!

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MORE power! That is the demand made by operators of shovels in quarries.

More power! It's needed to enable the shovel to dig deeper, to come up with a full bucket, to hoist quickly, to shake loose its load speedily—to load more wagons or cars per hour. More power! That is the gift of the Northwest ¾-yd. Gas or Electric Shovel to the quarry.

A simple rig of cables has eliminated auxiliary engines, gears, racks or pinions for the operation of the dipper stick. The Northwest's one-motor construction has made possible the direct application of the full power of the 57 h. p. gas engine or electric motor of equivalent capacity.

This ingenious cable arrangement gives 15 to 25% greater crowding power, does away with a loss of crowding power while hoisting, adds ideal control for shaking the dipper, lowers gasoline consumption and cuts maintenance costs sharply.

How the Northwest Shovel is given unmatched mobility by being equipped with the crawler base and truck like steering device made famous by the Northwest Crane and Dragline, how it may be converted into a dragline or clamshell crane in a few hours, how it loads itself and ships on one flat car—this is the story made clear by the specifications. Shall we send them to you?

Only one motor —gas or electric; no loss of crowding power while hoisting.

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Allis-Chalmers Style "N" GYRATORY CRUSHER

THE FOLLOWING ADVANTAGES SHOULD BE CONSIDERED

1—Less Friction than so-called low down or short frame crushers.

2—Horsepower reduced to a minimum, through the use of cut steel gears, and forced lubrication.

3—Greater discharge opening and stronger construction.

4—Machine can be made either regular drive, right hand or left hand by simply locating the bearing in the proper opening.

5—The lubrication is of the simplest and the most positive design.

6—Larger diameter shaft with 50% greater strength.

7—The reduction of installation height of 16% of the present gyratory crushers.

8—Improved hopper design.

9—Dust proof.

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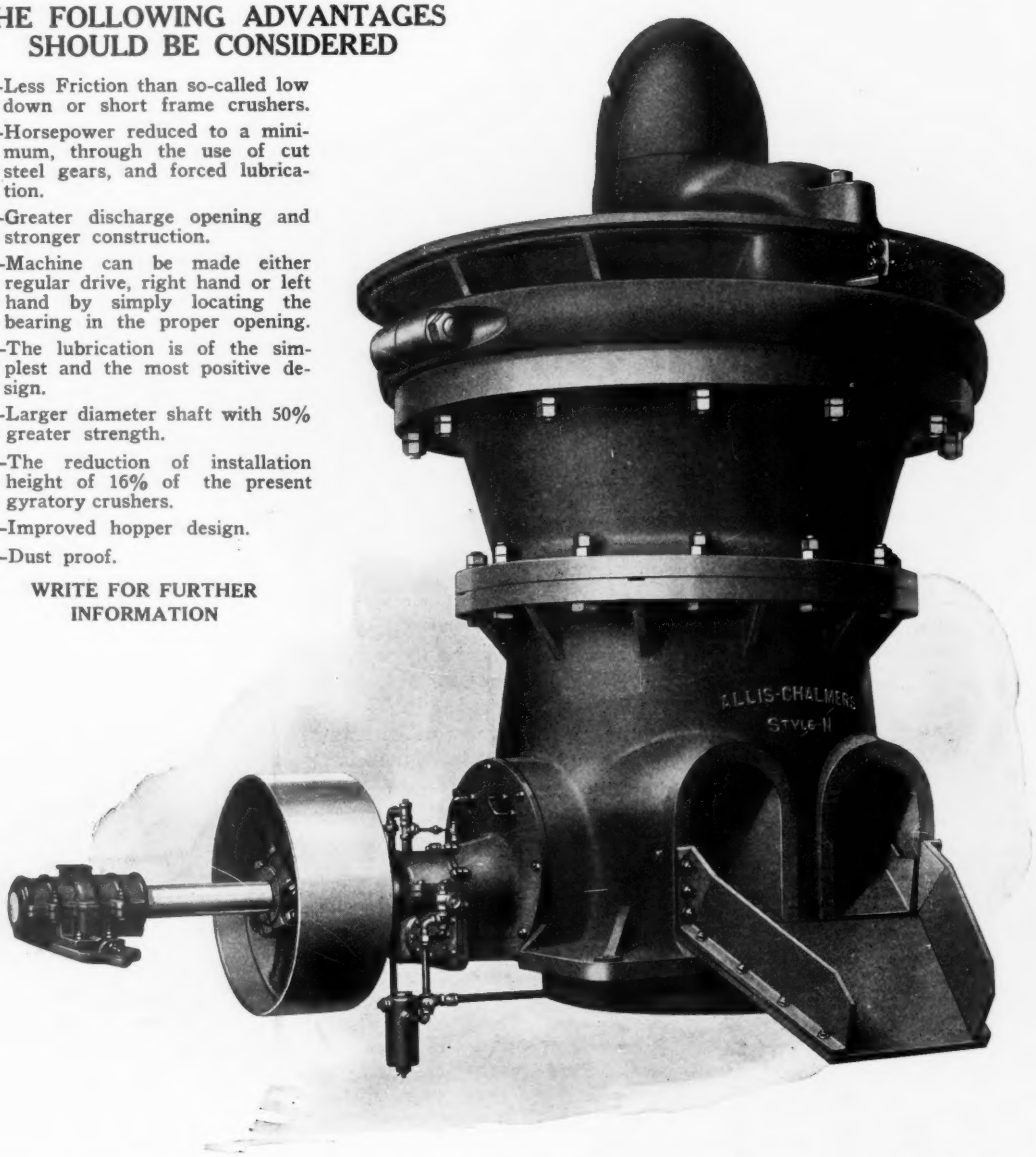

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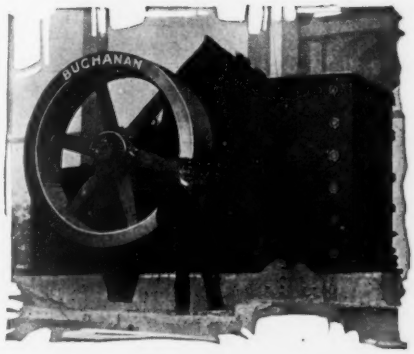
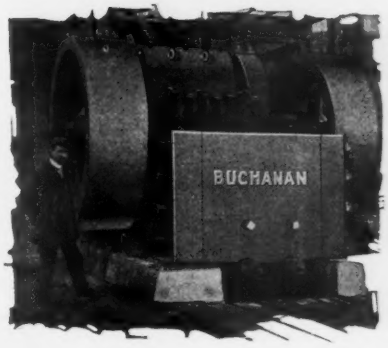
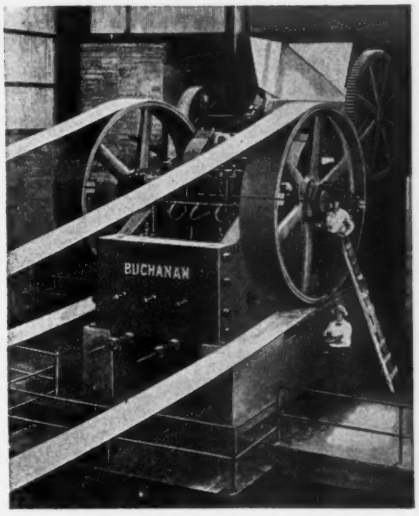


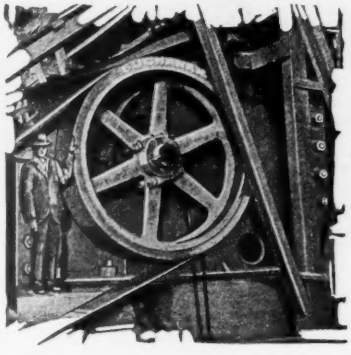
Extracts from letters written by users of BUCHANAN Type "C" Crushers located in this country, Canada and abroad.



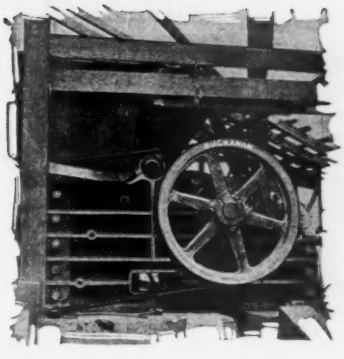
"We are all agreed that the BUCHANAN crusher is, from a mechanical point of view, the only real machine we have got. It gets no special attention (it evidently does not require it) and yet, today, after crushing over 100,000 tons of this particularly tough stone, it is running as quietly and well as when it commenced. We have never had a heated bearing and that is where all the other large crushers made in this country failed. It is practically noiseless and that means good work in a crusher. Messrs. Buchanan seem to concentrate all their attention on parts that matter."



"We have a 42 in. x 54 in. size BUCHANAN crusher working here. It was installed in August, 1920, and has been working five days per week without a break, crushing hard trap rock. The rock is dumped in six ton loads containing at times a large proportion of the bigger sizes, and the jaws are set to crush to 7 in. This crusher has never given us the slightest trouble. It is a massive machine, well designed and built, and of ample proportions for the work it has to do. We have no hesitation in saying that this is the best machine of its type which we have seen."



"This crusher has given complete satisfaction since its installation in 1916; first period on fifth level and second period on eighth level."



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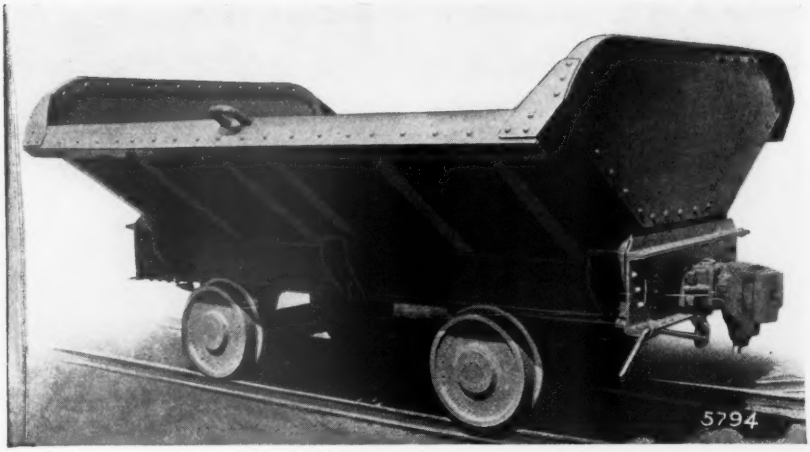

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Heavy axles with inside brass bearings with or without spring pedestals.

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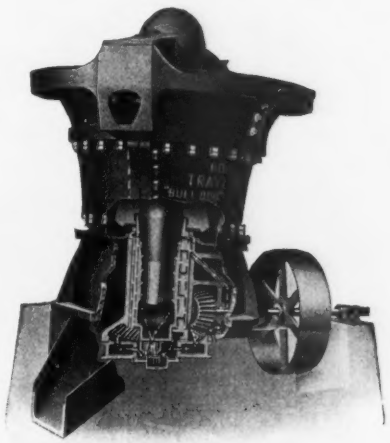

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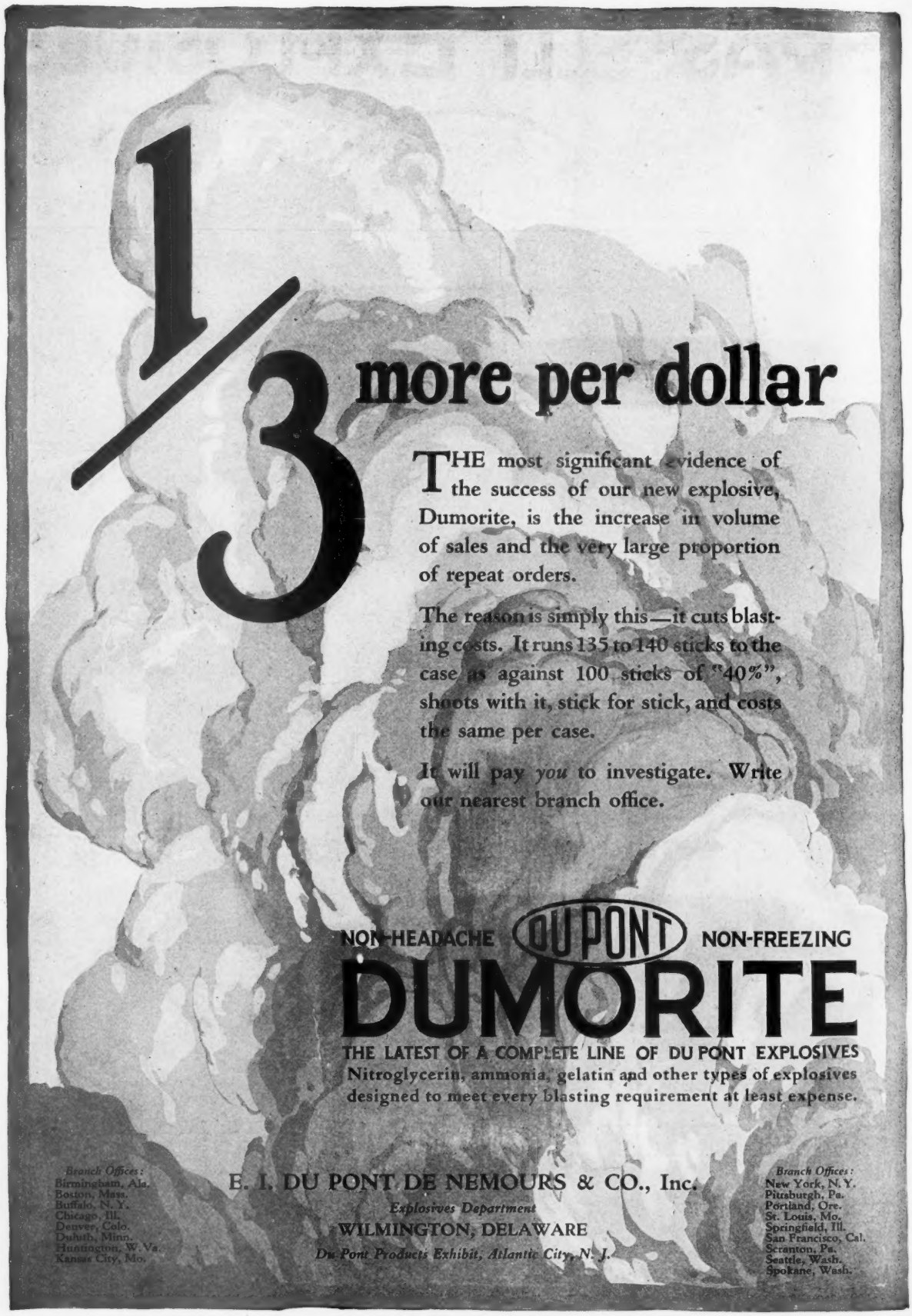
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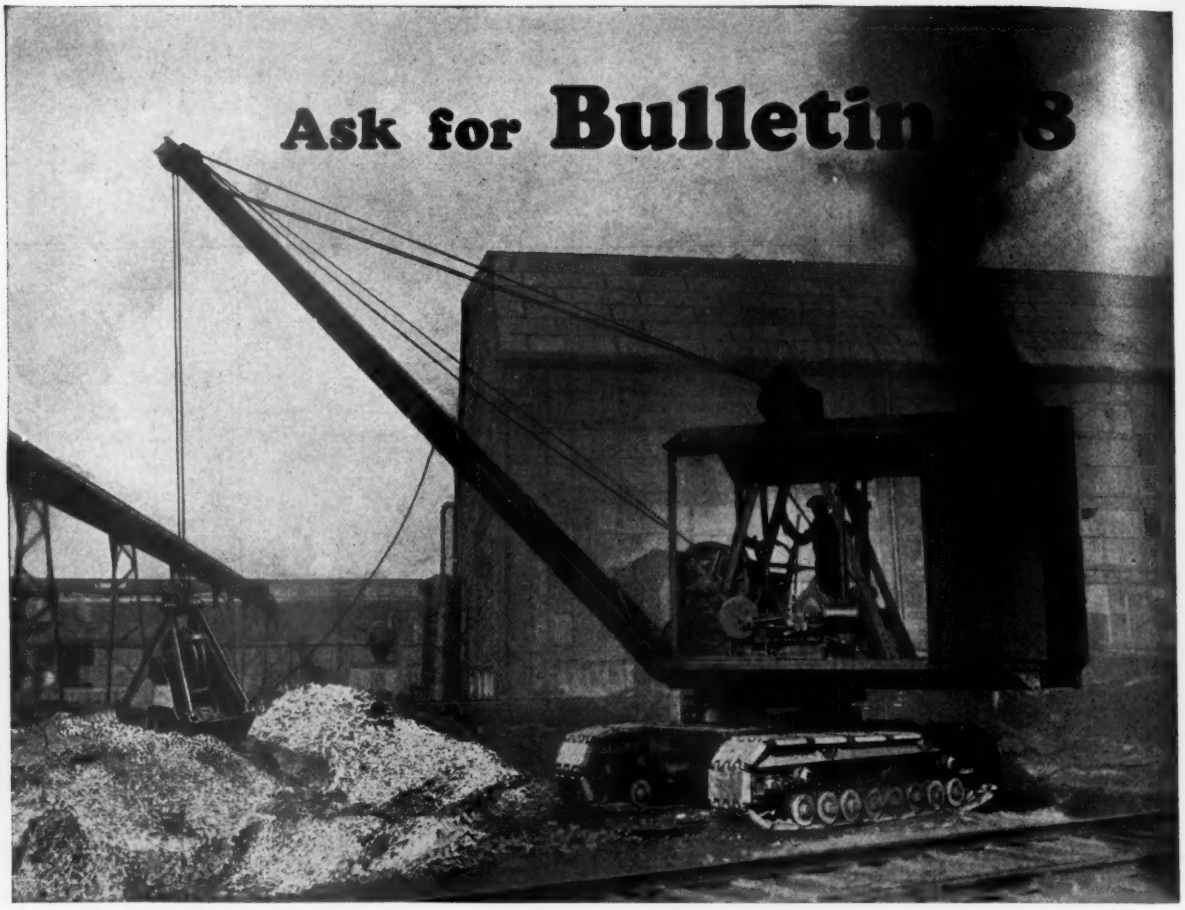

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15 Steers in any direction without the assistance of a ground man.

16 Gives full power to the crawlers while steering.

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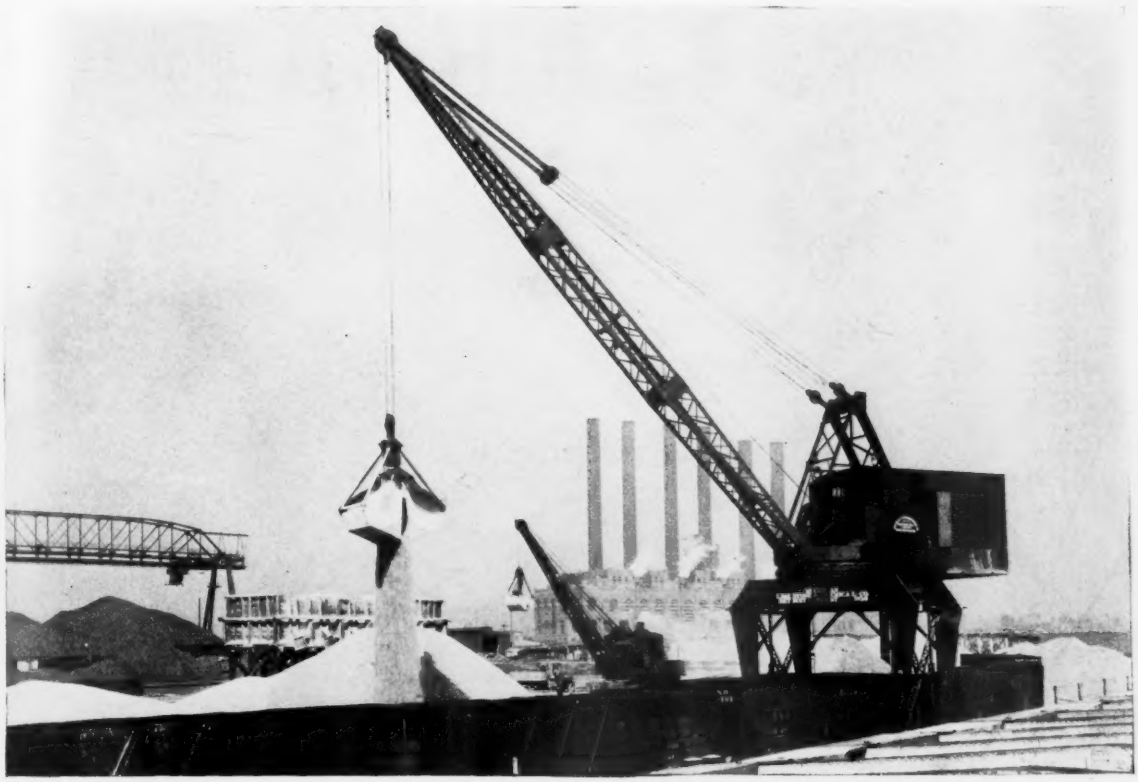

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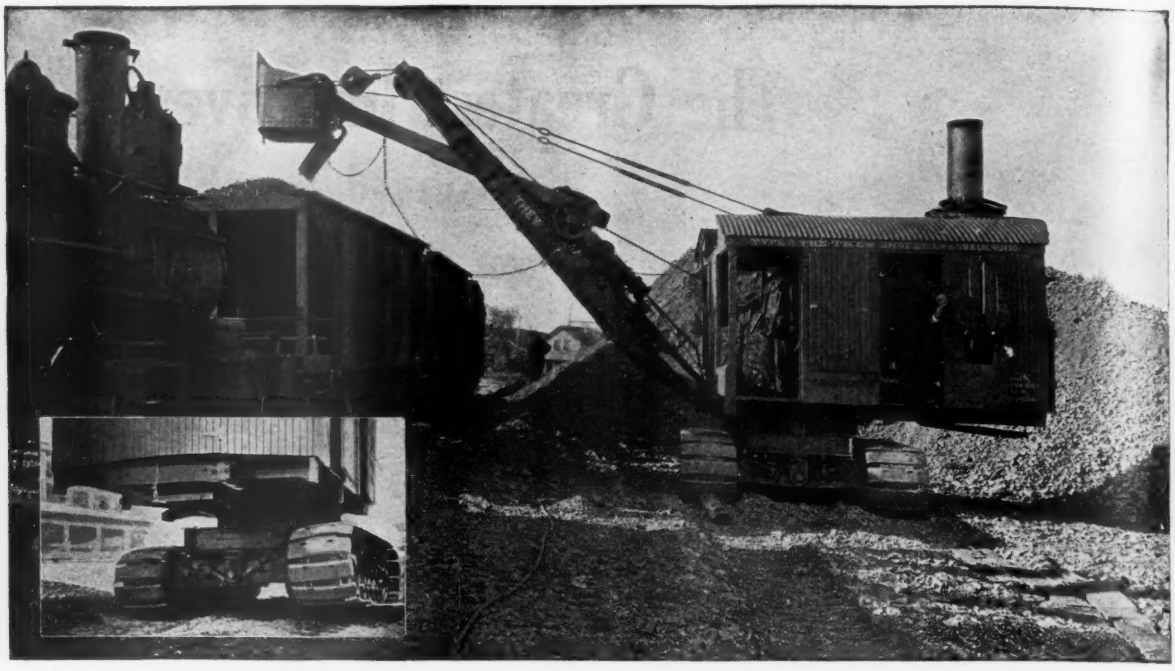


Upholding the Business End

The best boom that can be designed, backed by the most efficient engines and operating mechanism must be mounted on the right truck if your shovel is to accomplish all you expect it to.

Compare other continuous treads with the Thew. You will want to pay special attention to three features, the power steer, the two speeds and the flexibility.

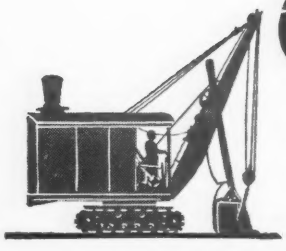
The Thew power steer is operated by the man in the cab. He simply kicks a foot lever, swings the boom a little and follows it around. No chains to hook up. No steam lines to connect. Quick, easy and effective.

The Thew has two speeds. One of 42′ a minute for climbing, soft earth, mud or tough going of any sort. One of 65′ a minute for level traveling and easy going. At low speed the Thew moves through or over anything and has been known to negotiate a 40% grade under its own power. All gears beneath the truck have steel covers.

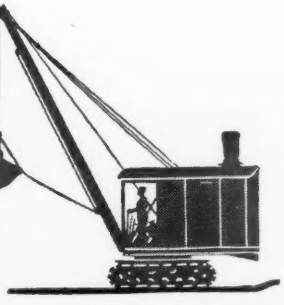
The Thew combines the good points of flexible and rigid designs without the evils of either. A swivel device on the front axle and tread frames keeps the traction even and uniform and the house level even when one tread is going over a timber, rock or other obstacle.

The third folder of a series on shovel construction is being mailed this month. This one covers trucks. When writing ask for 323.

THE THEW SHOVEL COMPANY, LORAIN, O.



Thew
Power Shovels



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The Greatest Improvement
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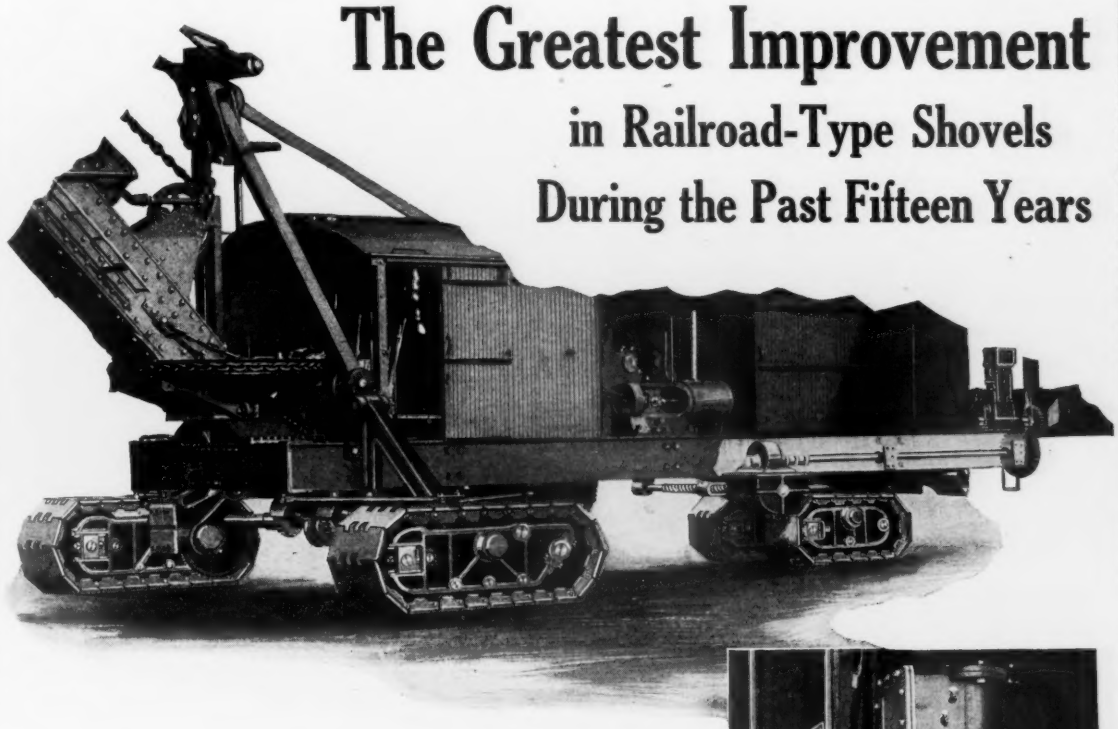
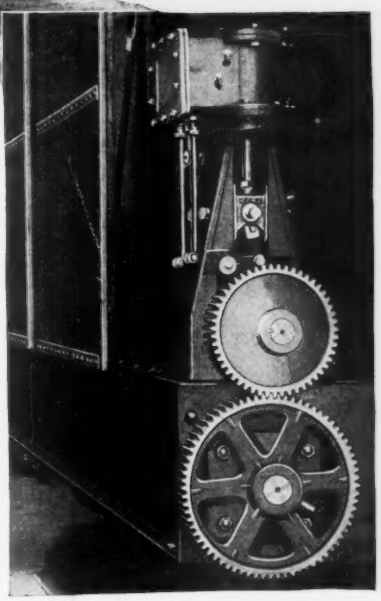


MARION Crawler Trucks are now perfected to such a degree that we can genuinely urge the abandonment of other types of mounting for railroad-type shovels. The inefficiency of common labor, combined with the high cost of track materials—ties, rails and jack blocks, and the resultant loss of time due to slower move-ups makes these new trucks especially desirable and economical.

Forward trucks can be propelled independantly or together. They have plenty of power and traction to move without slipping or miring. They have wide face and ample bearing. Pads and side frames are open hearth steel castings annealed and heat treated.

The rear truck is a single unit set under the center of the shovel. It is arranged to swivel in either direction and will easily adjust itself to rough or uneven bottoms. The three point support of the "crawler" trucks prevents twisting of the car body or binding of the shafts and machinery parts.

Full details of these new trucks will be gladly sent on request.



Steering Engine is set on deck along-side of boiler, not underneath the car body where it is difficult to adjust and where water, ice and dirt can easily collect. Engine is connected to rear truck through series of shafting and gears, which permit turning the trucks in either direction.

267

The Marion Steam Shovel Company
Marion Ohio.

Marion Crawler Trucks Make Hard Going Easy

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On ***every kind*** of belt—

Under ***every*** open drive condition: high-speed, low-speed, light or heavy duty, maximum strain—up and down and horizontal drives, on cross belts, half and quarter turn or mule drives—

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CRESCENT BELT FASTENERS

"Make Good Belts Give Better Service"

Crescent Belt Fasteners make a permanent joint BECAUSE:

They are the mechanical means for making belts endless.

They take a vise-like ***grip*** of steel that simply can't be broken — which long, hard, continuous service and maximum strain cannot loosen nor weaken.

The belt is not weakened—no holes are punched, no lengthwise fibres are cut.

The belt's ***maximum strength*** is maintained at the joint.

Strain is equally distributed across the entire width of the belt, for the entire life of the belt.

No part is subject to wear as no metal comes in contact with the pulleys. Belt runs same as endless on the pulley side.

The Crescent joint hugs the pulleys closely—insuring full power transmission.

If you are interested in increasing belting efficiency write for Service Book 6—it gives ***facts*** that will save you ***dollars.***

CRESCENT BELT FASTENER CO.

381 Fourth Avenue, New York

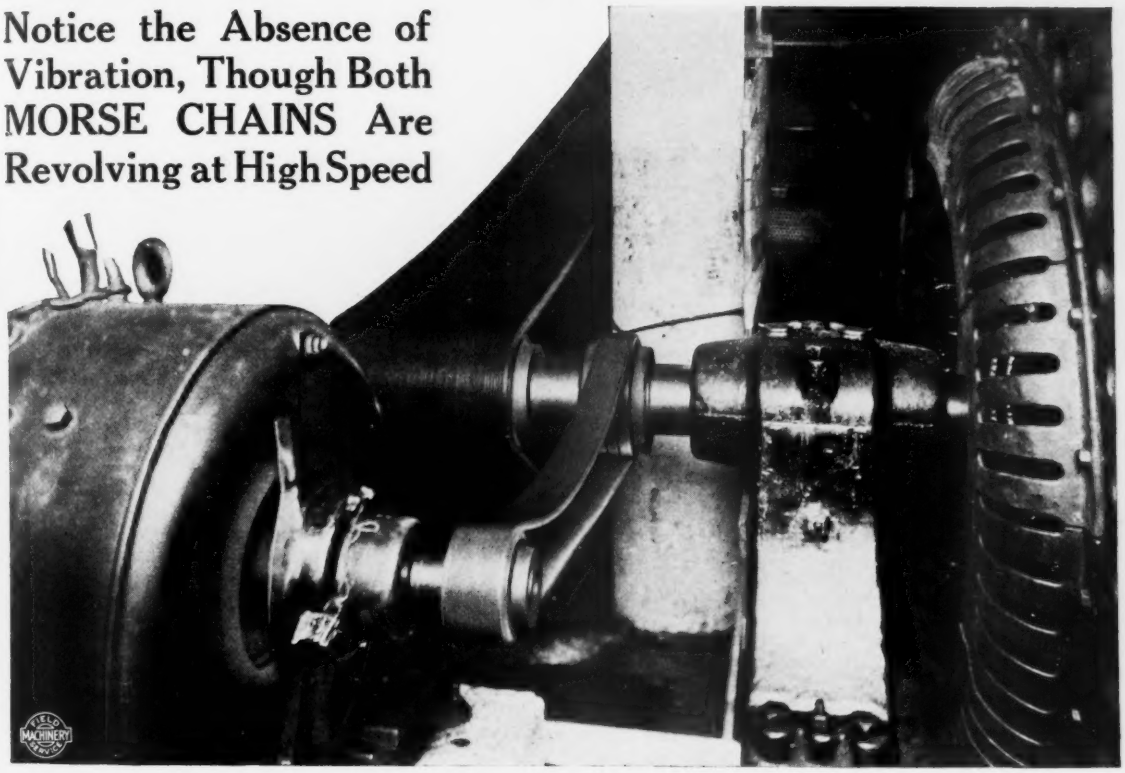
32 Front St., West
Toronto, Canada

32 Paradise St.
Birmingham, England

MORSE SILENT CHAIN DRIVES

THE MORSE "ROCKER JOINT"

Notice the Absence of Vibration, Though Both MORSE CHAINS Are Revolving at High Speed



DRIVES TO BIG ROLLING MILL AND EXCITER

When the above photo was taken at the NATIONAL LEAD COMPANY'S Brooklyn mill, they were too busy to stop the motor, but the picture demonstrates the complete absence of vibration with which the Morse Chain operates better than any verbal endorsement.

MORSE CHAINS have all the qualities necessary for the ideal drive. They are powerful, quiet and smooth-running; durable, power-saving, and economical to maintain; permit short center distances and withstand hard and continuous use in all kinds of service.

Write for Booklet

MORSE CHAIN CO., ITHACA, N. Y.

LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD

Morse Engineering Service — BENEFIT BY MORSE SERVICE AS OTHERS DO — *Assistance Without Obligation*

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NEW YORK CITY—30 Church St.
MINNEAPOLIS, MINN.—So. 3rd St., Strong-Scott Mfg. Co.
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"MORSE" IS THE GUARANTEE ALWAYS BEHIND THE EFFICIENCY, DURABILITY AND SERVICE

The Kaiser Paving Co., of Oakland, California has the contract for 18 miles of concrete paving connecting the Valley Boulevard with the Coast Line, at a cost of $530,000.

Material for this job will be hauled 27 miles, a round trip of 54 miles—and the hauling is being done by three PLYMOUTH 7-ton, 4 speed, Gear Drive Gasoline Locomotives.

Each Locomotive hauls a string of 27 cars, each car holding 3½ yards. At the start there is a grade of 1½ per cent, but the PLYMOUTH takes them up this grade seemingly without effort.

Ask us for Bulletin fully illustrating and describing this superpowered Locomotive.

The Kaiser Paving Co.'s Statement

The Kaiser Paving Co., states that they are using three 7-ton, 4 speed PLYMOUTH Gear Drive Locomotives, giving each 24 hour service, and each Locomotive is hauling 130 net tons of material per trip. Locomotives are doing everything and more than was expected of them.

The Fate-Root-Heath Company, Plymouth, Ohio

PLYMOUTH

Gasoline Locomotives